

**The International Cost Competitiveness  
of the Irish Pig Industry**

**by**

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## SUMMARY

The pigmeat industry is a relatively small part of the agricultural sector in the Republic of Ireland. About half the output of the industry is exported, mainly within the EU. The maintenance of the competitiveness of the Irish pig industry is therefore necessary for its survival.

There are many facets to the international competitiveness of an industry within a country and some of these are recognised and discussed in the study. The underlying assumption of the study is that over the long term, a major determinant of the competitiveness of the sector is the level of the costs of production, relative to those in competing countries.

The countries studied are Ireland, the UK, Denmark and the Netherlands. Production costs at the farm level are compared. Processing costs are not included in the comparison.

The cost comparison part of the study is preceded by an analysis of the pig industry in each of the countries studied. This puts the cost data in the context of the industry as a whole. Information is presented on production, consumption, trade, animal welfare legislation, environmental regulations and emerging strategic issues that will face the pig industry in each country.

Comparisons of production costs in the four countries were based on a model developed for 1999. The costs of production were compared on a whole carcass basis. Although pigmeat is more commonly traded internationally as cuts rather than carcasses, the complexities of estimating costs of production of different cuts in different countries made comparison on the basis of cut impracticable.

In this study, production costs were divided into three categories: feed, labour and 'other' costs. The inter-country comparisons were made on the basis of costs per kg estimated dressed carcass weight (est. dcw). The costs were initially calculated in national currencies and then converted to euro.

The authors recognise that cost comparisons at the carcass level ignore processing and distribution costs and so some cost items of relevance to final purchasers are not compared. The costs of production are only fully relevant determinants of competitiveness if a pig carcass is a commodity product. If this was the case all carcasses would be identical and the only reason that consumers would choose one over another would be on the basis of its price. This is not the case where there are large differences between the carcasses produced in different countries but in the countries studied, the carcass characteristics of weight and lean meat percentage were close enough to allow cost of production to be a guide to competitiveness.

Although the costs in each country were divided into feed, labour, and 'other' costs the international comparisons were only made on the basis of feed and 'non-feed' costs. This was due to slightly different definitions of the sub-divisions of these major cost categories in the countries examined.

A comparison of total costs per kg dcw in 1999 showed that Ireland had the lowest costs at IR£0.91 (€1.16) per kg dcw and the UK had the highest at IR£1.12 per kg dcw (€1.42).

The comparisons showed that in 1999, feed costs per kg were lowest in Denmark and highest in the UK. Non-feed costs were highest in the UK, Denmark and the Netherlands and lowest in Ireland. Ireland's low production costs are expected to increase since significant capital investment will be required to comply with animal welfare and environmental requirements. Improved animal welfare will probably also lead to higher labour costs because of the more intensive supervision that is involved.

Comparing feed costs, non-feed costs and total costs between 1995 and 1999 on an IR£ basis, showed that feed costs had declined in all the countries studied except the UK. Labour costs increased in all the countries. The greatest variation in costs between 1995 and 1999 was in the Netherlands and Ireland. Comparison of total production costs per kg dcw showed that Ireland, the Netherlands and Denmark have decreased their overall costs compared to the UK where total costs have increased. In the UK, the increase was largely due to the appreciation in the value of sterling relative to the Irish pound.

# CHAPTER ONE

## Introduction, objectives and methodology

### INTRODUCTION

Ireland's pigmeat industry is a relatively small part of the total agricultural sector, accounting for about 5.7 percent of the value of gross agricultural output in Ireland in 1999. It is a sector in which farm prices and inter-country trade are relatively undistorted by the market mechanisms of the Common Agricultural Policy (CAP). About half the produce of the Irish pig industry is exported, nearly all within the EU, where it has to compete with pigmeat produced in other Member States. Maintenance of the relative competitiveness of the Irish pigmeat sector against other countries is thus not only necessary for its growth, but also for its survival.

#### **The nature of competitiveness**

Competitiveness may be defined as a firm's or a country's ability to win or hold market share in the chosen market for its product. The problem with competitiveness, is not its definition but its measurement and projection. In this study, the competitiveness of the Irish pig industry on its chosen markets, is assumed to depend very much on the costs of production of pigmeat. The use of costs of production to assess competitiveness on export markets is not a new concept (Sharples, 1990), but is one which fits the situation facing the pig industry. This view of competitiveness is taken since the bulk of the value of a kg of pigmeat delivered to a market is the value that is added at farm level to the pig before it is slaughtered. Since pigs are relatively similar to each other, at least in the countries which form the basis of this study, it is assumed that this 'commodity' approach can be taken. A commodity is taken as being a good which differs from other similar goods mainly by its price. Many primary agricultural products fall into this category. For these products, there is a growing amount of literature which uses cost as a major indicator of competitiveness. Cost is used to assess competitiveness both between farms and between regions on the domestic scene and between countries in the determination of market shares of traded products (Ahearn, M. *et al* 1990, and Boyle, *et al* 1992).

Alternative concepts of competitiveness include those of the competitive performance, competitive potential and competitive process as outlined by Buckley *et, al.* (1988).

These three types of measures all examine the one concept, competitiveness, but they do so from different points of view. Potential, process and performance refer respectively to the beginning, middle and end of a system of competitiveness. No single measure of competitiveness exists which is adequate for all circumstances. The lack of such a measure is due to lack of data as well as the difficulty of constructing a consistent theory.

In this study, we recognise that there are many facets to competitiveness, and that many of them are qualitative and not easily applicable to inter-country comparisons. However, we make the assumption that the major determinant of the competitiveness of the Irish pigmeat sector on the markets that are studied is its price in relation to the prices of its competitors which are linked in the long term to their long run average costs of production.

The study is therefore conducted in terms of cost comparisons, and relative competitiveness between countries at a particular time on the basis of cost.

## **THE COUNTRIES STUDIED**

The countries studied include the EU Member States of the United Kingdom which is Ireland's major export market and also Denmark and the Netherlands which compete with Ireland in serving the UK market.

## **OBJECTIVES**

The objectives of this study are to establish the level and causes of the cost competitiveness of the Irish pig industry relative to those of the UK, Denmark and the Netherlands.

## **METHODOLOGY**

Since this study is based on the concept of 'cost competitiveness', achieving the objectives requires estimation of the costs of production of a kg of pigmeat in Ireland and comparison of this cost with the cost of doing the same job in the UK, the Netherlands and Denmark.

It involves the calculation and comparison of production or **farm costs** for Ireland and the other countries using 1999 data. This allows a comparison of Ireland's relative cost competitiveness in the recent past.



## **Data sources and analysis**

Reliable production cost data was obtained from analysis of secondary sources. The main sources of this data were economic institutes, statistical organisations and processing groups as well as marketing boards. A computerised spreadsheet (Microsoft Excel) was used to analyse the data.

The reliability of inter country comparisons of this type is always determined by the quality of the data used, since the concept relies solely on numerical comparisons in order to come to a conclusion.

Whilst the data used here is not from a single uniform survey using similar definitions and concepts, enormous care was taken to ensure that the data was as reliable, representative and comparable as possible. Discussions with industry leaders were used to check the results.

## **CHAPTER TWO**

### **The Pigmeat Industry**

#### **BACKGROUND**

Pigmeat accounts for 47 percent of world meat production compared with 29 per cent for beef and veal and 24 percent for poultry meat. In 1999 more than 1,029 million pigs were slaughtered which resulted in 81 million tonnes of pork being produced.

Considerably more pigmeat is produced within the EU than any other type of meat. Production in 1999 was estimated at 17.8 million tonnes. The EU was more than self sufficient in pigmeat and was therefore a net exporter. Pigmeat exports to non-EU countries in 1999 were 1.55 million tonnes. The main destinations being Russia and Japan. Denmark is the largest exporter of pigmeat to non-EU countries.

Pigmeat accounts for 49 percent of total meat consumption within the EU. Per capita consumption of pigmeat grew steadily within the EU and in 1999 stood at 44.6kg. However, there is wide variation within Member States. While in Denmark annual per capita consumption in 1998 was 63.1kg, in the United Kingdom it was only about 21.8kg.

#### **THE WORLD**

The world pig population was estimated at 913 million in 1999, distributed across all continents (FAOSTAT, 2000). Numbers have been growing steadily from about 400 million in 1960 and 857 million in 1990 to today's numbers. The largest pig populations are in China (429m), EU (121m) and USA (62m).

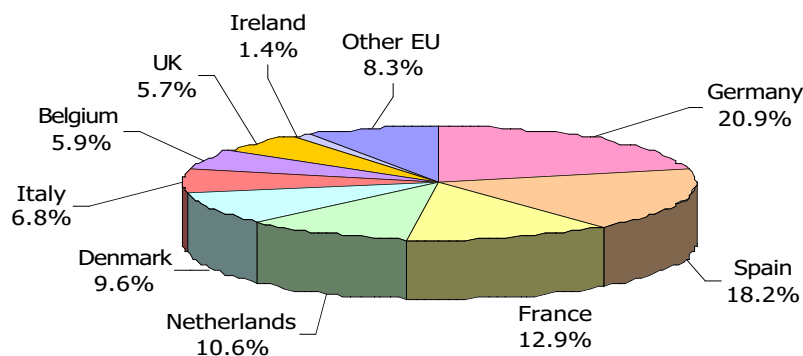
World pig meat production and consumption continues to increase as pig products gain an increasing share of the world meat market. The world market is dominated by Asia, which is responsible for 56 percent of consumption of pigmeat and pig meat products. Europe is the second major consumer of pigmeat and is also the second largest producing area.

In 1999, estimated world pigmeat production was 80 million tonnes. EU production is increasing faster than its consumption. The main world exporters are predominantly EU countries, in decreasing order: Denmark, the Netherlands, France and Belgium; Canada and the United States are the other major operators in the world market.

## THE EU PIGMEAT MARKET

The EU has 13 percent of the world's pig population and supplies 20 percent of the world's pork. Germany is the largest producer within the EU, but Spain is the country which increased its production most rapidly in the late 1990's.

**Figure 2.1: Share of total pig population in EU 15, 1999.**

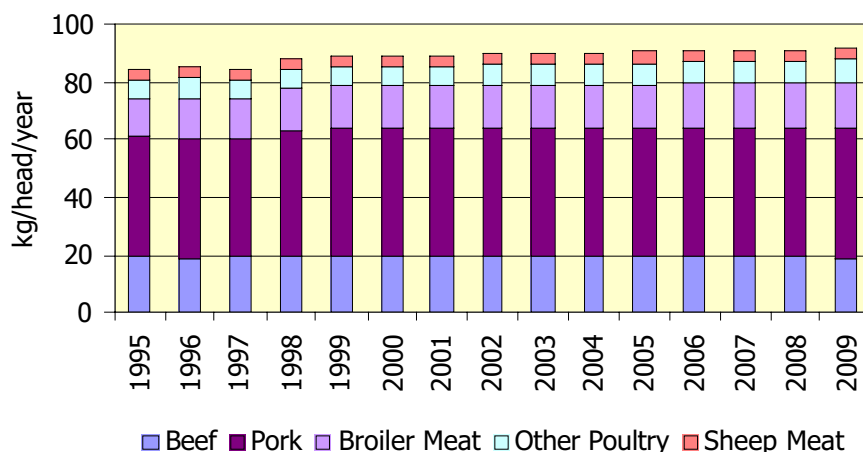


*Source: MAFF, 2000.*

Over the past 30 years, meat consumption per head in the EU has increased from 69.4kg per year in 1969 to 89.2kg in 1999. Pork consumption has increased by 20 percent over that period to 44.6kg per head in 1999. However, there is wide variation in pigmeat consumption between Member States from 21.8kg in UK to 63.1kg in Denmark.

After increasing over the five years to 1999, total per capita meat consumption in the EU is expected to show very slow growth in the subsequent ten years. While the five years to 1999 saw a 4kg per head increase in consumption, the subsequent ten years are expected to show only a 1.9kg rise. Beef consumption is expected to decline reflecting long historical trends. Broiler meat is expected to pick up 1.5 kg per capita by 2009 with pork gaining only 0.9 kg per capita (Young and Westhoff, 2000). Figure 2.2 shows the expected trend in meat consumption in the EU.

**Figure 2.2: Projected trend in EU meat consumption.**



Source: Young and Westhoff, 2000.

Community trade is dominated by intra-EU movement, with exports to third countries forming a relatively small proportion of total output. Intra-Community trade involves around 4 million tonnes per year, while exports to non-member countries are 1.5 million tonnes. Denmark and the Netherlands are the main exporters.

The volume of pigmeat imports to the EU is relatively small, originating mainly from Central and Eastern Europe. The three major importing countries in the EU are Germany, Italy and the United Kingdom. Total pork imports by Germany were around 1.2 million tonnes in 1999. The United Kingdom is a substantial net importer of pigmeat and pig meat products. In 1999, the UK imported around 0.5 million tonnes of pork (at slaughter weight equivalent). This made the UK the fourth largest importing country in the world.

For the coming decade, European pork exports are not expected to decline. Canada and the United States are projected to gain more than 90 percent of the increase in World pork trade. Russia and Japan are expected to provide a significant portion of the growth in demand for pork exports, with a number of other countries also increasing their pork imports, but by lesser overall amounts (Young and Westhoff, 2000).

### **THE IRISH PIGMEAT INDUSTRY**

In the mid 1980's a major rationalisation and investment helped to develop an internationally competitive export orientated pig meat industry. In 2000 more than half of Ireland's production was exported. The Irish pig industry is highly specialised and

concentrated on a small number of intensive and large producers which, on average, have high levels of physical performance.

Although Ireland has the highest average herd size (845 total pigs<sup>1</sup>) and one of the fastest growing pig industries in the EU, it still only accounts for 1.4 percent of total EU pig meat output. In Ireland, pig meat production represents 5.7 percent of gross agricultural output.

## **PRODUCTION**

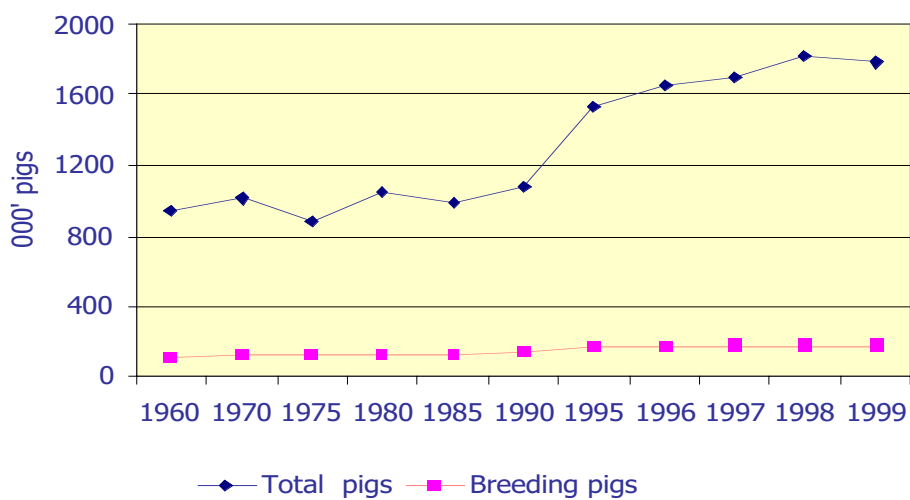
The largest numbers of pigs in Ireland are found in four counties: Cork, Cavan, Tipperary and Waterford. The four counties together accounted for 47 percent of the total number of pig units and 51 percent of number of sows of the country. Tuite (1999) reported that the concentration of sows in Co. Cavan is 1 sow per 4ha farmed, compared to 1 sow per 15ha in Cork and 1 sow per 21ha in Tipperary. On a country basis there is 1 sow per 25ha farmed.

Production has changed from a small scale enterprise carried out by a large number of farmers as an addition to the main farming activity, to today's industry where a small number of specialist producers operate large scale units using high quality breeding stock and up-to-date production techniques. The scale of the transformation that has taken place is highlighted by the fact that in 1960 there were 111,000 pig farmers whose average herd size was eight. Tuite, (2000) reported that about 98 percent of the production is produced in 550 commercial pig units. The number of pigs has increased from 0.95 million in 1960 to 1.78 million in 1999. Figure 2.3 illustrates the increase in pig numbers from the mid 1980's.

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<sup>1</sup> Total pigs: fattening pigs, young pigs, breeding pigs and boars (CSO, 1999).

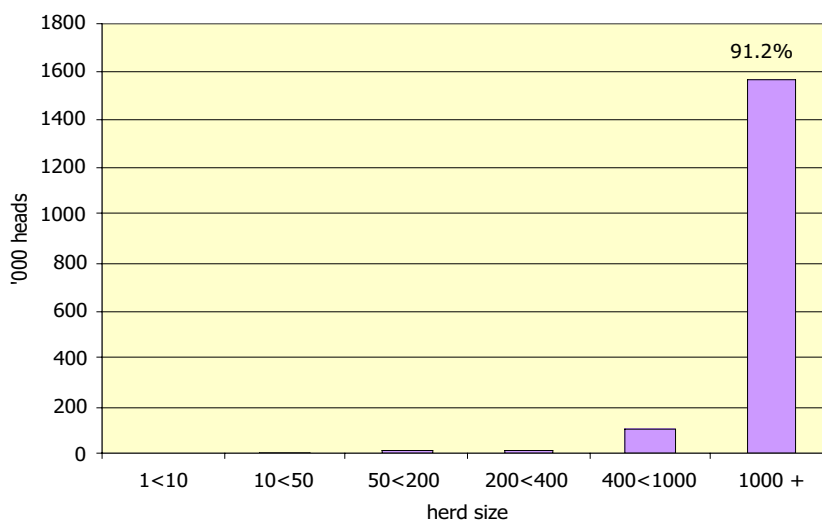
**Figure 2.3: Pig numbers in Ireland 1960-1999**



Source: CSO, 1999.

Figure 2.4 shows that 91.2 percent of all pigs are reared in a herd of 1000 head or more.

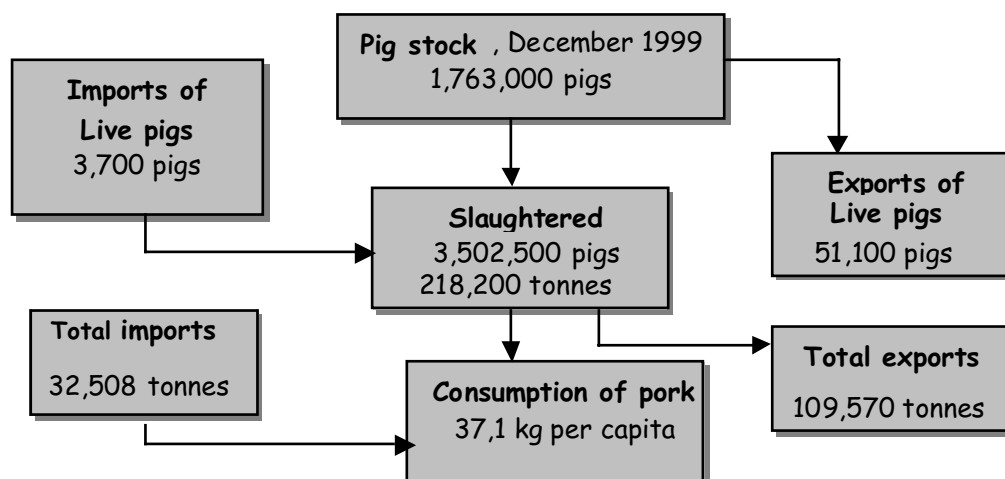
**Figure 2.4: Distribution of pigs in Ireland, by herd size (1999)**



Source: Statistics in focus, 1999.

In 1999, 3.5 million pigs were slaughtered in Ireland, with an average carcass weight of 68.4kg, this represents 0.22 million tonnes. Of this, 0.11 million tonnes were exported. Figure 2.5 illustrates the sales structure of the pig sector.

**Figure 2.5: Sales structure of the pig sector in Ireland, 1999.**

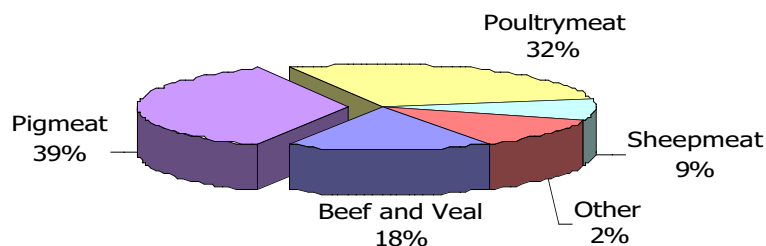


Source: CSO, 1999, 2000; Bord Bia 2000; Irish Trade Returns, 2000.

## CONSUMPTION

Pork consumption in Ireland increased from 35.5 kg per capita per year in 1989 to 37.1 kg in 1998. Pigmeat represents 39 percent of total meat consumption in Ireland. It is the meat with the highest level of consumption.

**Figure 2.6: Proportion of meat consumed in Ireland, 1998.**

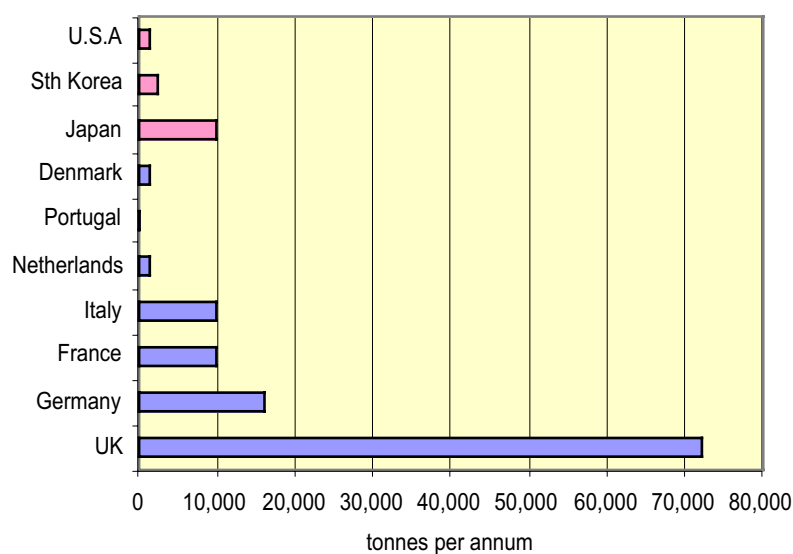


Source: CSO, 1999b).

## TRADE

The Irish pigmeat industry is very export orientated. Exports grew from 54,000 tonnes in 1990 to 135,000 tonnes in 1999. More than 100,000 tonnes of this were exported to the EU. The UK represents Ireland's biggest market accounting for over 50 per cent of total exports. Figure 2.7 illustrates the importance of the UK market as the main destination of Irish pork exports.

**Figure 2.7: Exports of pork from Ireland by destination, 1999.**



*Source:* Bord Bia 2000.

Exports to continental EU markets increased to over 40,000 tonnes in 1999. Germany, France and Italy were the principal markets. In markets outside the EU, Irish exports grew to around 21,000 tonnes. Japan is the principal market outside the EU with exports reaching 10,000 tonnes in 1999. Table 2.1 shows the trend in Irish pigmeat exports since 1990.



**Table 2.1: Destination of Irish pigmeat exports ('000 tonnes), selected years.**

<b>Year</b>	<b>1990</b>	<b>1993</b>	<b>1995</b>	<b>1997</b>	<b>1999</b>
<b>Total</b>	<b>54</b>	<b>88</b>	<b>100</b>	<b>108</b>	<b>135</b>
Of which to:					
U.K	29	37	52	58	72
France	8	11	10	10	10
Germany	8	15	15	15	16
Italy	2	7	7	7	10
Other EU	3	7	6	6	6
<b>Non EU</b>	<b>4</b>	<b>11</b>	<b>11</b>	<b>12</b>	<b>21</b>
Japan	3	4	5	8	10
USA	0	0	1	1	2
S. Korea	0	0	2	1	3
Other	1	7	3	2	7

*Source:* Bord Bia, 2000.

Table 2.2 shows that pork cuts represent the biggest proportion of value and quantity of pigmeat exports from Ireland.

**Table 2.2: Composition of exports of pigmeat (tonnes)**

	<b>1998</b>	<b>%</b>
Pork carcasses	14,486	13.5
Pork cuts	73,785	68.7
Bacon and ham	5,848	5.4
Processed products	13,364	12.4

*Source:* Bord Bia, 2000.

After Finland, Ireland imports the least amount of pigmeat among Member states, 32,500 tonnes in 1999. Table 2.3 shows the origin of Irish pigmeat imports.

**Table 2.3: Origin of Irish pigmeat imports (tonnes)**

	<b>1999</b>
<b>Total</b>	<b>32,507</b>
Of which:	
Great Britain	10,308
Northern Ireland	4,997
Netherlands	6,622
Denmark	3,902
France	2,329
Germany	2,419
Other	1,930

*Source:* Bord Bia, 2000.

The majority of pigmeat imports into Ireland come from Great Britain and Northern Ireland, representing nearly 50 percent of all imports.

### **SLAUGHTERING AND PROCESSING PLANTS**

A characteristic feature of the Irish pig industry is the concentration levels in both the production and processing sectors. As an export orientated industry those plants with an export licence hold the major percentage of slaughterings. These plants normally pay a small premium for pigs which meet the specifications required for export. Capacity of the export plants is estimated to be 69,000 to 73,000 pigs per week or 3.5 million pigs per year. The three principal companies with export plants are Irish Country Meats, Galtee, and Dawn Pork and Bacon.

There is also a small export plant, Greenvale Carlow, slaughtering around 4,500 pigs per week. It is estimated that these four companies account for around 90% of all Irish pig slaughterings with the remaining going through local pork butchers (Baldwin, 1999).

#### **Grading and payment system**

Pigs are sold to the slaughterhouse on a deadweight grading basis. Lean meat percentage, within a specified weight range, is the grading criteria. The basic price is awarded for pigs between 55kg and 80kg with an estimated lean meat percentage of 54 percent. For each percentage increase in lean meat there is a bonus of 2p/kg and deductions of 2p/kg are enforced on carcasses for every percentage point of lean meat below 54 percent. Set bonus payments are also made for delivery. Loyalty bonuses are

also given while deductions are made for items such as levies and inspection fees (Healy, 1996).

### **Quality assurance**

Bord Bia, the Irish Food Board, is in charge of the Pigmear Quality Assurance Scheme. The scheme was first introduced in 1989 and was revised in 1997 to incorporate recognised International Quality Management Systems, Hazard Analysis and Critical Control Points (HACCP) and EU Food Hygiene Legislation.

The revised scheme integrated the farmer and the processing plants, taking into account the methods of production, the health and welfare of the animal and the practices employed both on the farm and in the abattoir.

The scheme requires inspections at farm level and audits of processing plants to ensure compliance with the scheme requirements. It is the abattoir which is the member of the Bord Bia scheme and which receives permanent audit. It is the responsibility of the abattoir to employ professional auditors to inspect the supplying farms and to ensure that farm standards are implemented.

The areas included in the farm requirements are:

- Stockmanship and training
- Pig welfare: housing, temperature, ventilation, feed and water.
- Herd health: maintenance and control
- Transport: Pig Haulier Code of Practice
- Health and safety on the farm
- Environmental protection

Figure 2.8: The quality mark for meat produced in Ireland under the Bord Bia quality assurance scheme.



## **ANIMAL WELFARE LEGISLATION**

Pig welfare in Ireland is mostly governed by the *European Communities (Welfare of Pigs) Regulations 1995* and the welfare requirements do not go beyond compliance with European legislation. The EU legislation specifies that by the end of 2005, all tethered dry sow housing must be replaced by stall or loose-housed systems.

However, the Commission of the European Communities (2001) has elaborated a proposal to amend the Directive 91/630/EEC laying down minimum standards for the protection of pigs. The proposal aims to ban the use of individual stalls for pregnant sows and gilts and the use of tethers; increase the living space available for sows and gilts and allow the sows and gilts to have permanent access to rooting materials. These new requirements should apply to all holdings by no later than 1 January 2012.

Additionally, as the UK is the principal export market for Irish pig meat, there is increased pressure to adopt UK standards and convert sow tethers systems to loose-house systems as quickly as possible. In 1997, Teagasc Pig Advisory Service estimated that 59 percent of dry sows were housed using tethers. By 2000 this had dropped to 50 percent (Teagasc, 2000).

## **ENVIRONMENTAL REGULATIONS**

Ireland is one of the less densely populated countries in the EU and it has not yet (2000) identified “nitrate vulnerable zones”<sup>2</sup>. Lucey *et al* (1999) pointed out that the overall condition of Irish waters remains satisfactory and compares favourably with the position in other European countries.

The main pollution concern in Ireland is the eutrophication of fresh waters related to phosphorus inputs from diffuse sources, especially agriculture. Therefore, the emphasis of the Irish policy and legislation in relation to agricultural nutrients has focussed on reducing the loss of phosphorus rather than nitrates.

Although the overall water condition in Ireland is relatively good, in 1999 under the *1990 Water Pollution Act*, Cork County Council enacted Bye-Laws to control Nitrogen and Phosphorus use in agriculture. These laws affect the catchments of the Rivers Lee, Gradogue and Funshion.

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<sup>2</sup> Obligation under Council Directive 91/676/EEC.

### **Code of Good Agricultural Practice**

Ireland also has prepared a Code of Good Agricultural Practice in order to fulfil obligations arising under the *Nitrate Directive* (91/676/EEC). The Code applies in all parts of the country and is voluntary.

**Table 2.4: Summary of the Code of Good Agricultural Practice**

<b>Most important features:</b>	
<b>Application of manure</b>	Must not exceed 250 kg of nitrogen/hectare/year in areas where surface and groundwater are in good condition (i.e. nitrate concentrations do not exceed 20 mg/l and there is no evidence of eutrophication). In all other areas it should not exceed 210 kg per hectare per year.
<b>Spreading of animal manure</b>	Each year, at least half the slurry produced during the winter housing period should be landspread by 1 July and the remainder by 30 September.
<b>Capacity to store animal manure</b>	The Code advice is to have at least 4 months storage capacity. 5 and 6 months are recommended in places with a high risk of pollution.

### **Integrated Pollution and Control (IPC)**

The Environmental Protection Agency Act 1992, established a framework to control environmental pollution in Ireland. The implementation of Integrated Pollution Control (IPC) in Ireland commenced in March 1994 and regulates industries which have significant polluting potential.

The IPC licence takes account of the effect that certain activities have on the environment as a whole. The main environmental objective of IPC is to prevent or solve pollution problems rather than transferring them from one part of the environment to another.

In granting an IPC licence to an activity the Environmental Protection Agency (EPA) must be satisfied that the best available technique not entailing excessive costs (BATNEEC) will be used to prevent pollution.

Under the Environmental Protection Agency Act there are various classes of activities that require an IPC licence. "Intensive Agriculture" is one of them and both pig and poultry rearing activities are included.

For pig production, the First Schedule to the EPA Act 1992, specified that new or expanding units that are included in the description made below, required a licence from 3 September 1996. The description in the case of pigs is:

“The rearing of pigs in installations, whether within the same complex or within 100 metres of that complex, where the capacity exceeds 1,000 units in gley soils or 3,000 units on other soils and where units have the following equivalents:

- 1 pig = 1 unit
- 1 sow = 10 units”.

The licensing of established pig facilities is being introduced in phases and depending on the size of the unit the producer must apply before a specified date. The producer has the responsibility of applying for a licence when it is required and the operation of a pig facility beyond the due date gives EPA powers to prosecute the producer.

Table 2.5 shows the specified date when pig facilities exceeding a certain number of units must apply for an IPC licence.

**Table 2.5: Installations for the rearing of pigs that require an IPC licence**

<b>Specified date:</b>	
<b>Capacity exceeding:</b>	
10,000 units	10/3/1998
7,000 units	9/6/1998
6,000 units	1/9/1999
5,000 units	4/4/2000
4,000 units	5/9/2000

*Source:* Environmental Protection Agency

In Ireland, the concentration of pigs in large units means that a high proportion of the national herd will be in the “licensed” category. Table 2.6 shows the estimated percentage of units that will have to comply with the IPPC Directive.

**Table 2.6: Estimated licensable units in Ireland**

	<b>Units</b>	<b>Sows</b>
<b>Breeding</b>	12%	37%
<b>Integrated</b>	34%	71%
<b>Finishing</b>	37%	70% (pigs)

*Source:* Tuite, (2001).

### **Integrated Pollution Prevention and Control (IPPC)**

It is expected that the Integrated Pollution Prevention and Control Directive will be enacted in early 2002 in Irish legislation. Implementation of the Directive will effectively create a uniform approach for environmental regulation of the pig production sector across all the EU. Irish pig units with IPC licences in place will be at an advantage, as their existing licences will largely meet the requirements of the Directive. The Directive requires licensing of pig units on the basis of best available technology (BAT). Considerable attention is being paid to emissions of ammonia from pig production in this process. This will present a challenge to the industry both in terms of emissions from buildings and slurry stores and losses following land application. Such focus is fuelled by the UN Economic Commission for Europe document on long range trans-boundary pollution which identifies control techniques for preventing and abating emissions of ammonia (Power, 2000).

### **Environmental Impact Assessment Directive (EIA)**

The Council Directive 97/11/EC of 3 March 1997 on the assessment of the effects of certain public and private projects on the environment increases the number of impact assessments required compared with the 1985 Directive (85/337/EEC).

According to the Directive the projects listed in Annex I should be made subject to a compulsory assessment. Annex I includes installations for the intensive rearing of pigs with more than 3000 places for producing pigs (over 30 kg) or 900 places for sows. For projects listed in Annex II, which includes pig-rearing installations (without specifying a specific number of places for producing pigs), the Member States shall determine, through a case-by-case examination, if the project requires an environmental impact assessment.

Those projects that require an assessment should provide information such as:

- a description of the project including a description of the physical characteristics of the whole project, land use requirements, design and size of the project;
- an estimate, by type and quantity, of expected residues and emissions;
- a description of the aspects of the environment likely to be significantly affected by the proposed project, including, in particular, population, fauna, flora, soil, water, air, climatic factors, landscape and architectural and archaeological heritage;
- a description of measures envisaged in order to avoid, reduce and, if possible, remedy, significant adverse effects,
- the data required to identify and assess the main effect which the project is likely to have on the environment.

## **STRATEGIC ISSUES FACING THE IRISH INDUSTRY**

The Irish pig industry is facing several strategic issues. The first is the continuance of relatively high levels of production in competitor countries (which may include USA). The second is the 1994 Uruguay Round Agreement (URA) of the GATT. The reduction of tariffs and easier access to sources of feed grains has reduced pig feed prices from their pre-reform levels. The next round of WTO negotiations will probably continue where the URA left off, leading to reduction of remaining tariffs and the value and quantity of export subsidies. The less restrictive trade environment that resulted from the 1994 GATT reforms and whatever comes out of the next WTO rounds means that maintaining market share within the EU may become more difficult. Also, there is the impact of environmental and animal welfare legislation, which is argued to add costs to the production system that are not recovered in the market place (Tuite, 2000).

### **The 1994 GATT Agreement and the next WTO round**

The 1994 GATT Agreement significantly reduced the amount of pigmeat which could be exported from the EU with the aid of subsidies and reduced the total value of these subsidies. The next WTO round may continue this trend and the probable reduction in tariff levels will also make it easier for non-EU pigmeat to enter the EU market. Under the 1994 Uruguay Round Agreement the volume of export subsidies was reduced by 36 per cent of the 1986-1990 average for developed countries. Between 1995 and 2000 import levies were reduced also by 36 percent.



The liberalisation of trade and consequent reductions in price support for cereals should mean that on a world-wide basis both producer prices and production costs will decline. Since 1994 this appears to have been the case. In the longer term, lower costs and input prices will allow lower pigmeat prices which will encourage increased consumption. This will be particularly evident in industrialising developing countries where consumption has been increasing because of increasing incomes per capita even with no price decline.

### **Reform of the CAP**

The costs of production of pigmeat within the EU is heavily influenced by the EU's cereals regime since feed grain is a major component of animal feed and feed costs are the largest part of the cost of pig production. Because EU grain prices have been higher than world prices, EU pigmeat production costs have been higher than those outside the Union. The CAP reforms of 1993, (the MacSharry reforms) and those of 1999, (Agenda 2000) will reduce the price of feed grain in Ireland and hence the cost of pig production. Before the URA of 1994, pigmeat prices in the EU were protected from outside competition by a system of "sluicgate" prices and import levies. These were used to set a minimum import price for pigmeat which was higher than the market price within the EU. Under the URA the sluice gate prices and import levies were replaced with fixed import tariffs.

The EU cereals regime has undergone substantial change under both the MacSharry reform and Agenda 2000 reforms of the CAP. A reduction in cereal prices to their world level has been a core element of the CAP reform. Over time this will reduce the Irish pig industry's absolute level of feed costs. It will not, however, reduce Ireland's relative feed cost disadvantage but may exacerbate it, since transport costs will not decline in the same way. Much will depend on the proportion of feed costs and the change in the rate of feed conversion efficiency in Ireland relative to competing countries.

### **Impact of EU and national environmental and animal welfare restrictions**

Many parts of the EU are now experiencing a clash between intensive pig farming and the environment. The conflict of interests is most apparent in the Netherlands, Belgium and the northern part of France, where large numbers of pigs are concentrated on a small area of land. One of the most important pieces of EU legislation affecting the pig sector is the "Nitrates Directive" (91/676/EEC) (Brouwer *et al* 1993). This Directive is designed to limit the extent to which agriculture will contaminate water sources with surplus nitrogen. The Directive was agreed in 1991 and was brought into operation over the eight year period to 1999. In the Netherlands it is estimated that meeting the requirements of the Nitrates Directive may add 12 to 20 per cent to the cost of pig

production. Other EU countries which compete with the Netherlands may face similar cost increases, depending on their circumstances. However, some developing countries such as Brazil may not face as large an increase as European countries and it is argued that this may improve their competitive position on the international market.

Animal welfare issues are becoming increasingly more important. With countries like UK, Sweden, the Netherlands and Denmark setting the agenda for animal welfare, which add costs to the production system (i.e. group housing for pregnant sows, increased floor area per pig, more solid floors in pens) that may not be fully recovered in the market place.

### **Feed costs**

Although the EU pigmeat sector was not part of the MacSharry reforms or Agenda 2000 it has been indirectly affected via the impact of the reduction in cereal prices and, consequently, feed costs. Feed is the largest single cost in producing a finished pig. It is likely to represent 65 to 70 percent of total costs.

The cost of compound feeds is determined mainly by the price of cereals, cereal substitutes and protein that make up the diet. In Member States the cereal price up to 2000/01 cereal season was generally determined by the level of the EU intervention price modified by local supply and demand conditions. The prices of protein-rich feeds such as soybeans are not directly affected by the CAP and their prices generally reflect the balance between supply and demand on the world market.

The high price of cereals within the EU prior to CAP reform led to the increased use of “cereal substitutes”. Since the MacSharry and Agenda 2000 reforms, the reduction in the price of cereals has led to reduced imports of these substitutes. Cereal substitutes are mainly industrial food by-products which are imported from outside the EU. Nearly all the protein feeds and cereal substitutes used in Ireland are imported and most are trans-shipped through Rotterdam. This means that Ireland tends to have a location or transport cost disadvantage in relation to animal feed ingredients (Kelly and Reidy, 1990). The extent of this disadvantage will depend on the proportion of imported raw materials in the ration, the type of material imported, the size of the ship it is transported in, the size of the port handling facilities, the level of unloading charges and the time of year.

For grain users in Ireland, the most obvious implication of the reductions in grain prices following the CAP reform of 1992 and 1997 is that lower priced grain must carry the same transport cost to export markets. For example, a £12 transport charge on grain

valued £100 is 12 per cent, whereas the same transport charge amounts to a transport disadvantage of 24 percent on grain costing £50.

Thus, while CAP reform might substantially reduce feed costs, the cost of feed in Ireland, **relative** to the main cereal growing areas of the Community, will increase. In inter-country trade it is relative rather than absolute costs that determine cost competitiveness, but not necessarily comparative advantage.

## **CHAPTER THREE**

### **Countries Chosen for Comparison**

#### **INTRODUCTION**

In this study the competitiveness of Ireland's pigmeat industry is compared with that of the Netherlands, Denmark, and the United Kingdom.

Denmark and the Netherlands are the main EU exporters to world markets and are Ireland's main competitors. While Ireland is not comparable with these countries in terms of national output, it is comparable in production technology and technical efficiency. The United Kingdom was selected because it is similar to Ireland in pig production methods and also because it is Ireland's principal export market accounting for 53 percent of total exports of pigmeat in 1999.

Pig producers must adhere to rules and restrictions which are a result of environmental and animal welfare concerns. It is beneficial to look at the national environmental and animal welfare regulations as well as the costs involved in complying with these rules and restrictions, as these costs might affect the competitive position of Ireland's pig industry.

Also, this chapter contains a description of the Danish, Dutch and UK pig industry. This is intended to show how management and features other than costs can affect the competitiveness of the Industry.

#### **DENMARK**

Denmark is one of the world's leading exporters of pork. It is the fifth largest pig meat producer in the EU, but the largest exporter. In 1999 the exports of pigmeat products accounted for 6.2 percent of the total value of Danish exports and 46.3 per cent of total agricultural exports. Denmark is also the EU's largest consumer in terms of kg

per head per year, although because of the small population it is the seventh largest consumer market in the EU.

The Danish pig industry is highly integrated and benefits from a close link between farmers, abattoirs and processors. Around 95 percent of Danish pigs are slaughtered, processed and marketed by three large co-operative societies, owned and managed by the pig producers.

## PRODUCTION

Pig production is distributed all around Denmark, with 76 percent of the pig population on the mainland of Jutland and the other 24 percent spread around the islands.

Over the last twenty years larger producers have replaced smaller ones. In 1999 there were only 15,483 farms with pigs, compared with 130,098 in 1968. Pig production remains on family holdings. Almost one in three family farms operates a commercial pig enterprise (see Table 3.1). The number of suppliers<sup>1</sup> to slaughterhouses fell from 76,022 in 1978 to 18,750 in 1999. At the same time production has nearly doubled since 1970 reaching 19.9 million pigs in 1999. Herd size also increased significantly between 1970 and 1999. By 1999, large herds (more than 500 pigs) accounted for almost 93 percent of all pigs (Figure 3.1 and 3.2).

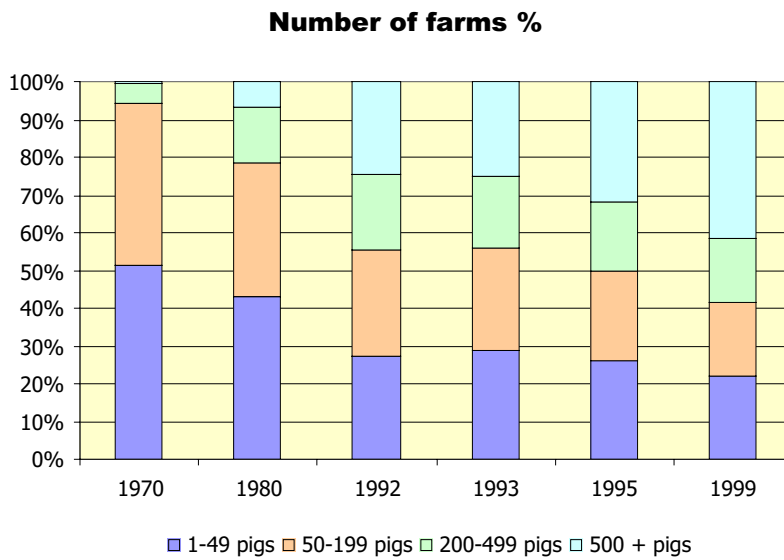
**Table 3.1: Number of farms in Denmark**

	1978	1988	1999
Number of farms	125,521	84,093	57,831
Number of farms with pigs	76,383	34,322	15,483

*Source:* Danmarks Statistics In: Danske Slagterier Statistics 2000.

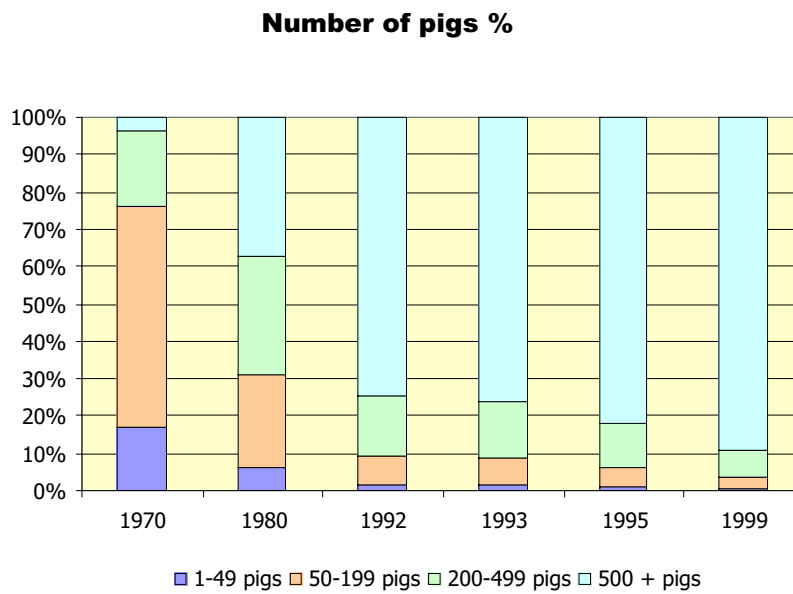
<sup>1</sup> The “number of suppliers” is a different variable from “number of farms with pigs” and may involve some double counting.

**Figure 3.1: Distribution of pig farms by size of herd: Denmark, selected years.**



Source: Danmarks Statistics, 2000.

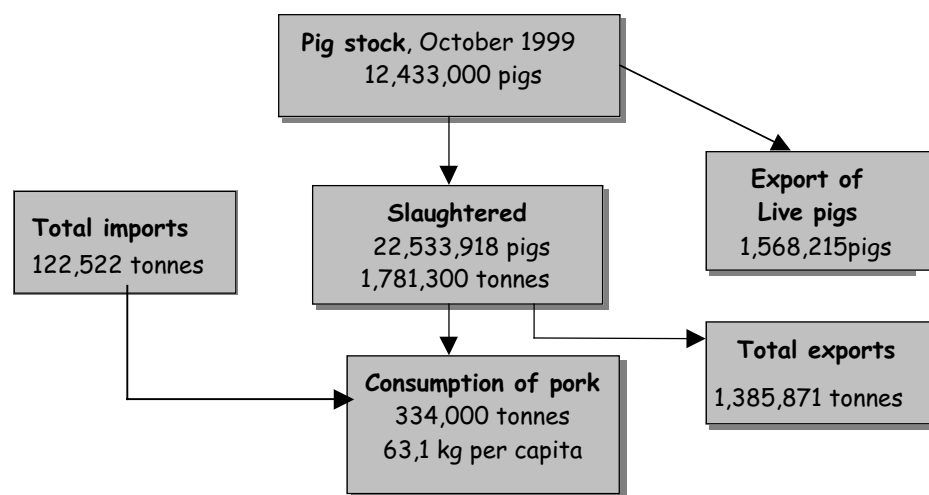
**Figure 3.2: Percentage to total pig herd in farm size categories: Denmark, selected years.**



Source: Danmarks Statistics, 2000.

In 1999 slaughtering production was 22.5 million pigs, with an average carcass weight of 76kg. Danish pigmeat production amounts to about 1.7 million tonnes per year. This represents around 10 percent of total pigmeat production in the EU. Figure 3.3 summarises the sales structure of the Danish pig industry.

**Figure 3.3: Sales structure of the pig sector in Denmark, 1999.**



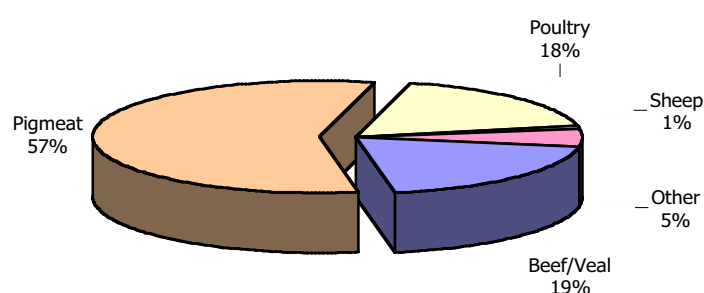
*Source: Danske Slagterier Statistics, 2000; Eurostate 1999.*

## CONSUMPTION

Denmark with a population of around 5.3 million inhabitants represents a small market for the amount of pork that is produced. In 1998, Denmark was 508 percent self-sufficient, illustrating the Danish pork industry's reliance on exports.

Pigmeat consumption stood at 334,000 tonnes in 1998, representing 63.1kg on a per head basis per year. Denmark is the second largest consumer of pigmeat in the European Union after Spain. Pigmeat is the meat most preferred by consumers.

**Figure 3.4: Meat consumption in Denmark, 1998.**



Source: Eurostat 1999.

## TRADE

After the United States, Denmark is the second largest pigmeat exporter in the world. The Danish pig industry is based on export markets. About 85 percent of Danish pigmeat production is exported. Countries in the EU accounted for 60.4 percent of Danish exports of pigmeat by quantity in 1999 (Table 3.2). The main export markets within the EU are Germany, UK, Italy and France.

**Table 3.2: Danish pigmeat exports, 1999**

tonnes		Total	% share
EU		890,471	60.4
of which	Germany	305,366	34.3
	UK	238,427	26.8
	Italy	112,284	12.6
	France	90,897	10.2
	Other EU	143,497	16.1
Other Europe		161,161	10.9
Of which	Poland	23,756	1.6
	Czech Republic	4,713	0.3



USA		54,956	3.7
Canada		5,720	0.4
Central America		9,487	0.6
Latin America		9,498	0.6
Of which	Argentina	8,216	0.6
Africa		2,566	0.2
Japan		205,043	13.9
China		11,317	0.8
Other Asia		121,490	8.2
Of which	Republic of Korea	59,585	4.0
	Hong Kong	28,177	1.9
Oceania		11,344	0.8
<b>Total</b>		<b>1,474,104</b>	<b>100</b>

*Source:* Danske Slagterier Statistics, 2000.

Outside the EU, Japan imports the largest quantity of Danish pig meat, accounting for 13.9 percent of total exports. About a third of Danish pig meat exports are to third countries which account for 42.3 percent in value.

Most of the exports are in the form of cuts and processed products specially differentiated to meet the specific needs of the Danish export markets and to obtain high added value (Table 3.3). Bacon used to be the main export product, but today Danish bacon takes a smaller share of total exports and is principally exported to the UK.

**Table 3.3: Composition of Danish pigmeat exports, 1999.**

Tonnes	<i>EU</i>	<i>Third countries</i>	<i>Total</i>
Live pigs and sows	88,233	86	88,319
Bacon	113,229	1,148	114,377
Carcasses, fresh/frozen	50,007	2,938	52,945
Cuts	456,468	446,826	903,294
By-products	101,775	71,035	172,810
Canned meat	59,367	37,506	96,873
Other processed products	21,391	24,095	45,486
Total	890,471	583,633	1,474,104
% share	60.4	39.6	100

*Source:* Danske Slagterier Statistics, 2000.

Since 1977 pigmeat export quantities expanded consistently from 539,255 tonnes to just under 1.5 million tonnes in 1999. Tables 3.4 and 3.5 illustrate the trends in pigmeat exports by quantity and value respectively.

**Table 3.4: Trend in Danish pigmeat exports – by quantity 1977-1999.**

Tonnes	<i>1977</i>	<i>1987</i>	<i>1997</i>	<i>1999</i>
Live pigs and sows		1,226	66,379	88,319
Sow meat	45,587	18,061		
Bacon	208,298	133,242	130,115	114,377
Carcasses, fresh and frozen	6,242	932	49,373	52,945
Cuts	96,693	395,736	795,976	903,294
By-products	39,485	92,917	169,316	172,810
Canned meat	125,750	176,300	118,204	96,873
Other processed products	17,200	18,932	58,002	45,486
Total	539,255	837,345	1,387,367	1,474,104

*Source:* Danske Slagterier Statistics, 2000.

**Table 3.5: Trend in Danish pigmeat exports – by value 1977-1999**

<i>1000 Dkr.</i>	<i>1977</i>	<i>1987</i>	<i>1997</i>	<i>1999</i>
Live pigs and sows		14,332	881,613	731,887
Sowmeat	405,913	215,810		
Bacon	2,005,831	2,393,830	2,985,272	2,259,244
Carcasses, fresh and frozen	69,458	15,320	576,840	407,141
Cuts	1,272,272	8,077,716	15,427,618	13,426,740
By-products	276,106	666,044	1,151,070	893,743
Canned meat	1,768,500	3,664,485	2,543,240	1,944,595
Other processed products	285,280	344,565	1,162,076	840,254
Total	6,083,360	15,392,103	24,727,729	20,503,606

*Source:* Danske Slagterier Statistics, 2000.

## **STRUCTURE OF THE PORK INDUSTRY**

The co-operative system has been fundamental in the Danish pig industry. Around 95 percent of Danish pigs are slaughtered, processed and marketed by co-operative societies. Cutting, processing and marketing is integrated within the structure of the companies.

Three large co-operative groups, Danish Crown, Steff-Houlberg and Tican, slaughter around 22 million pigs per year. The three companies are what remains of an industry that in 1970 numbered 50 co-operatives and 4 privately owned slaughterhouses (Table 3.6)<sup>1</sup>.

The three co-operatives are members of Danske Slagterier (DS), the umbrella organisation which represents the interest of Danish pig producers, factories and processing units.

<sup>1</sup> In November 2001 Danish Crown and Steff-Houlberg merged, creating one of the largest pig processing companies in the world.

**Table 3.6: Number of Slaughterhouses in Denmark 1970-1999.**

	1970	1980	1990	1997	1999
<b>DS Members</b>					
Co-operatives	50	18	5	4	3
Privately owned	4	2	1	0	0
Total slaughterhouses	54	20	6	4	3
Total number of slaughter units	60	36	27	22	22
<b>Not DS Members</b>					
Privately owned <sup>1</sup>	n/a	n/a	7	8	9

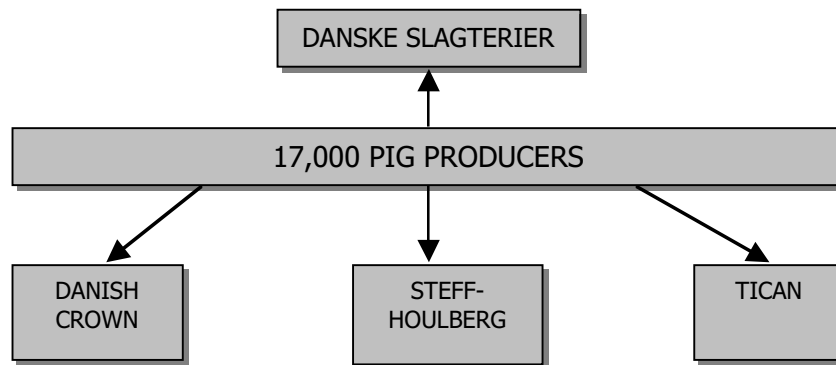
<sup>1</sup> Slaughterhouses with slaughterings over 10,400 pigs per year.

Source: Danske Slagterier Statistics, 1999. Note: n/a: data not available.

Danske Slagterier is funded by a statutory levy on pig producers, a subscription from its member companies and a rebate of Danish Land Tax. The Federation's concerns are primary pig production, which includes pig breeding and producer advisory services. Additionally, DS takes care of the industry's interests in the area of trade politics not only in Denmark but also in the EU and other international markets. The organisation also plays a role in co-ordinating marketing and promotional campaigns both in Denmark and in key export markets.

In co-operation with the National Committee for Pig Production (Landsudvalget for Svin), DS funds a major programme of research into all aspects of pig production and industry research and development is carried out at the Danish Meat Research Institute. Also, DS is in charge of co-ordinating a number of quality initiatives such as the Danish Quality Guarantee. Figure 3.5 illustrates the integrated structure of the Danish pig industry under Danske Slagterier and the three slaughterhouses: Danish Crown, Steff-Houlberg and Tican.

**Figure 3.5: Integrated Structure of the Danish Pig Industry**



*Source:* Danish Bacon & Meat Council, Information & Statistics 2000.

### **Grading and payment system**

To ensure stability, Danske Slagterier sets a weekly common price that is determined by a quotation committee so the processing co-operatives do not have to compete for pig supplies. Both farmers and the slaughterhouses are represented on the committee and the price is based on the return per carcass earned the previous week. Each slaughterhouse collects the prices it receives in the market place, costs of production are deducted and this information forms the basis of the price that the farmer will receive the following week. This system ensures each producer receives the same price for pigs of a given specification. It also saves on transportation costs as there is no price incentive for producers to send live pigs long distances and eliminates the intermediary or a network of buyers employed by the abattoir.

For the abattoir it reduces risk as margins on slaughtering and any processing activities are fixed whatever the market conditions are. If the pig abattoir co-operative makes profits this is paid to members, in the form of an annual bonus once the annual accounts have been completed. Besides this, the slaughterhouses pay premiums above the base price for high quality carcasses and make deductions for low quality ones. The additional payments are established using two parameters: carcass weight and lean meat percentage.

Weight payments apply to slaughter pigs between 50.0 and 109.9kg. The price for pigs between 67.0 and 79.9kg has no deductions, but price deductions apply if pigs are under or over these ranges of weight. The basic price quotation is for carcasses

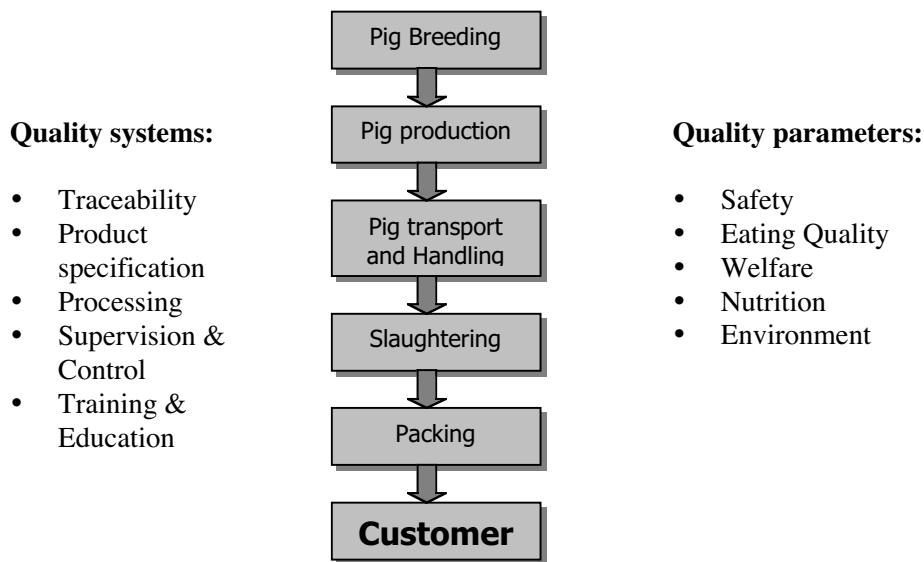
with a lean meat percentage of 59 percent. Carcasses below the basic quotation receive a price deduction, those above 59 percent obtain a bonus. The Danish grading and payment system encourages farmers to deliver carcasses in the 67.0-79.9kg range with at least 59 percent lean meat. The average carcass weight and meat percentages reported by Danske Slagterier in 1999 were 76kg and 60.0 percent respectively.

### Danish Quality Guarantee

The Danish Quality Guarantee, first published in January 1997, provides a baseline for quality performance throughout the Danish co-operative pigmeat industry. It applies to the whole of the pigmeat industry, from production through to delivery to customers, and covers all Danish pigmeat products.

The integrated structure of Denmark's meat industry provides a basis for the development of meat safety, meat quality and animal welfare. As shown in Figure 3.6, the Danish quality guarantee involves quality systems and parameters all the way through the production chain.

**Figure 3.6: Danish Quality Guarantee**



Source: Danske Slagterier webpage.

The Danish pig industry has benefited from its dependence on export markets, with a variety of quality specifications, because, it is claimed, this has led to an integration of quality requirements in all the stages of pig production. It is also claimed that the co-

operative system managed by DS has meant that quality procedures have been more easily agreed and enforced.

**Figure 3.7: Quality mark**



### **ANIMAL WELFARE**

Denmark, like other EU Member States, has to comply with the *Council Directive 91/630/EEC* of November 1991, which lays down minimum standards for the protection of pigs confined for rearing and fattening. However, consumers' requirements concerning the production of pigmeat besides being reflected in legislation is manifested in specific demands. Therefore, as well as the Act on loose sows there is a specific contract for production of pigs to be exported to the UK.

#### **Act on loose sows**

The Act became effective on 1 January 1999, but buildings in use before that date only have to fulfil the requirements by 1 January 2014. Table 3.7 summarises the main elements of the Act.

**Table 3.7: Summary of Danish Act on loose sows.**

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The Act provides as follows:

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Sows and gilts must be loose from 4 weeks after service at the latest and until 7 days before expected farrowing.

---

Individual animals that are removed from a group due to welfare problems can be placed in relief pens or crates.

---

Requirement of available pen area – depending on group size.

---

Of the pen area, at least 1.3 m<sup>2</sup> per sow and 0.95 m<sup>2</sup> per gilt must be with solid floor and bedding.

---

Showering systems or the like for adjustment of the animals' body temperature must be installed.

---

Gestating sows and gilts must be given straw, or other roughage material.

---

No pen for groups of sows may be narrower than 3 m.

---

A relief pen may accommodate no more than 3 animals.

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Each animal must have an area of at least 2.8 m<sup>2</sup>. The pen must be at least 3.5 m<sup>2</sup>.

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*Source:* Danske Slagterier webpage.

### **Contract for the production of “UK Pigs”**

The Danish co-operative system has been characterised as able to respond quickly to new market requirements. The UK market requires imported pigs to be produced according to the same laws and guidelines as apply to UK producers.

To retain existing market advantages in the UK market about 30 percent of Danish pigs must be produced according to these guidelines. A supplement of DKK 0.30 (3 IRp) per kg per pig complying with the UK requirements has been paid since 1 January 1999.

The contract for the production of UK pigs provides assurance to retailers and consumers that the Danish welfare and safety standards comply with all relevant UK legislation. Compliance with the contract for the production of UK pigs will place additional responsibilities on participating producers (see Table 3.8).



**Table 3.8: Summary of the Danish contract for the production of “UK pigs”.**

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Summary of the Contract:

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All pregnant sows must be kept in ‘confinement free’ systems.

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A formalised production registration system must be maintained.

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A formalised record of all bought-in feedstuffs and materials must be maintained.

---

Use of meat and bonemeal in feedstuffs is not permitted.

---

All producers wishing to enter the Contract are subject to an independent inspection by their local Pig Production Consultant from the Danish Agricultural Advisory Service DAAS, to verify their compliance with the requirements of the Contract.

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The local Pig Production Consultant must conduct an annual audit.

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The producer may also be subject to an additional ‘spot check’ by an approved auditor from the DAAS. Spot checks will cover each local Pig Production Consultant’s area, thus guaranteeing that objectivity and independence is maintained.

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*Source:* Danish Bacon & Meat Council.

## **ENVIRONMENTAL REGULATIONS**

In Denmark the conflict between environment and livestock production is less severe than in some other European Countries. Stocking of pigs is evenly distributed and the Danish also have the advantage that, although their units may be specialised, they are often combined with mixed farming which allows the manure to be used in such a way as to diminish its environmental hazards.

However, the whole country has been identified as vulnerable to nitrate pollution from agriculture. Several policy measures have been introduced to solve the environmental problems produced by agricultural activity. The most significant piece of agro-environmental legislation in Denmark has been the *1987 Aquatic Environment Program*. The legislation was introduced to prevent the contamination of watercourses and ground water by agricultural activity. It set targets for reduction of emissions of nitrogen, phosphate and other organic matter (Brick *et al* 1997).

In 1990 it was recognised that the objectives in terms of nitrogen leaching were not achieved. This led to the *Action Plan for Sustainable Agricultural Development* which

was aimed at reducing nitrate pollution from agriculture (Beghin and Metcalfe, 1998). This plan was introduced in 1991 and the rules were enforced from spring 1993.

Table 3.9 summarises the rules and restrictions imposed upon Danish farmers to protect the environment.

**Table 3.9: Summary of environmental regulations**

<b>Summary:</b>	
<b>Application of manure</b>	Must not exceed 170 kg of nitrogen/hectare/year (1.7 animal units per hectare*).
<b>Spreading of animal manure</b>	<u>Liquid manure</u> is prohibited from autumn harvest to February 1. <u>Solid manure</u> , no spreading is allowed in autumn prior to October 20
<b>Capacity to store animal manure</b>	Farmers with more than 30 livestock units to have a minimum of at least 9 months storage capacity.
<b>Land utilisation</b>	Land use requires an autumn cover crop after harvesting to take up nitrogen. 65% of the land on each farm has to be covered in winter.
<b>Land ownership</b>	Farms with animal production traded after 1 September 1996 should own a minimum percentage of the land, which is required for the disposal of their manure.  Farms of 251-500 livestock units per year have to own 75% of the land required to spread the manure generated by the operation. Farms with herds of 15,000 heads per year or larger have to own 100% of the land.
<b>Fertiliser management plans</b>	Farms larger than 10 hectares must adhere to fertiliser management plans that include restrictions on manure spreading and incorporation into the soil.

\* 1 Livestock unit = 3 sows plus progeny to 25kg or 30 pigs 25kg to slaughter.

## **THE NETHERLANDS**

In the period 1960 to 1985 the pig population in the Netherlands grew very rapidly. The reasons for this growth were the increasing consumption of pigmeat in the EU and the favourable competitive position of the Dutch pig industry.

The Netherlands is the EU's fourth largest pig producer and the second largest exporter after Denmark. With an average herd size of 826 pigs per holding in 1999, the Dutch pig industry ranks amongst the most intensive in the EU. Intensive livestock production has contributed to the deterioration of the environment. In recent years public concern about pollution from livestock has resulted in restrictions on production and disposal of slurry.

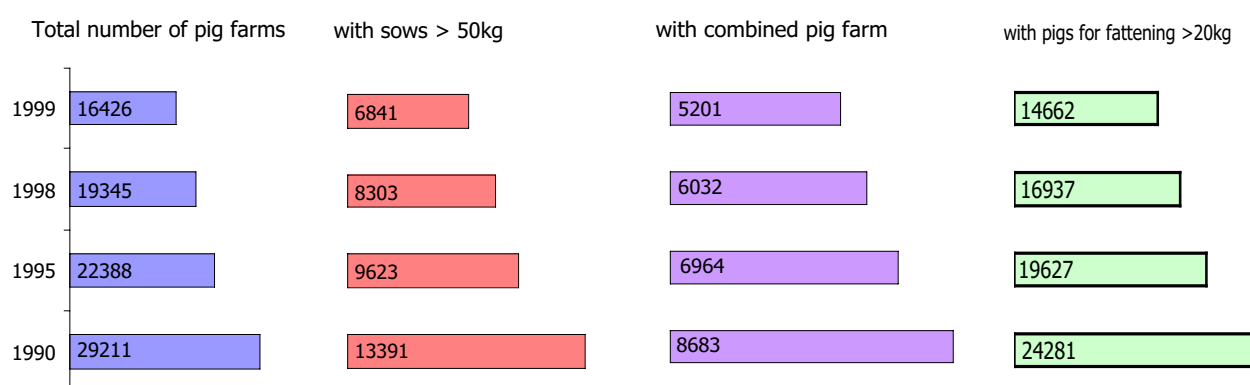
In addition to the environmental constraints, in 1991 and 1992 the Dutch pig industry was badly affected by an outbreak of Blue Ear disease. Also, in 1997 10 million pigs were taken out of the Dutch market in order to control an outbreak of Classical Swine Fever disease. This situation arose at around the same time as considerable production increases in North America and other European countries and an economic crisis resulted in reduced demand from Asia and Russia.

### **PRODUCTION**

Pig production is mainly located on the sandy soils in the eastern and southern parts of the country, with 63 percent of the total number of pigs located in two provinces: Noord-Brabant and Gelderland.

In 1999 the Dutch pig population was about 13.6 million pigs. In total 19.5 million were slaughtered in 1999 which produced 1.7 million tonnes of carcasses. Pig production is highly concentrated into relatively few holdings. In 1999 the total number of holdings with pigs was 16,426, of which 6,841 kept breeding sows. More than 90 percent of the farms with breeding sows have more than 100 animals (Figure 3.8).

**Figure 3.8: Dutch pig farm structure, several years.**



Source: Dutch Product Board for Livestock, Meat and Eggs (2000).

The trend in the latter part of the 1980's was towards rapid expansion (see Table 3.10). However, pollution restrictions and pig disease have combined to restrict production since 1990. Nevertheless between 1983 and 1999 slaughtered production increased by over 20 percent.

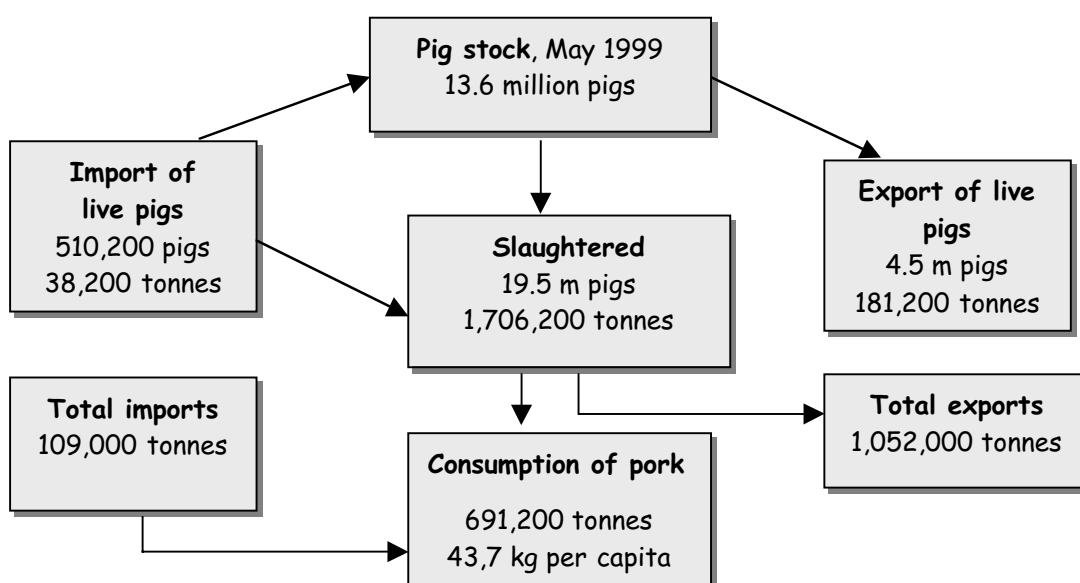
**Table 3.10: Trends in the Pig Production in the Netherlands 1960 - 1999**

	Number of pigs (‘000)	Number of farms with pigs (‘000)	Average number of pigs per farm
1960	2,955	146	20
1970	5,533	76	73
1980	10,137	44	230
1994	14,565	24	607
1999	13,567	16	848

Source: den Hartog (1995); Product Board for Livestock, Meat and Eggs, 2000.

Slaughtering reached 19.5 million pigs in 1999. The average carcass weight of pigs slaughtered in the Netherlands has risen steadily in recent years to reach its current level of about 89kg. The Netherlands produced about 10 percent of total EU pig production. Figure 3.9 summarises the sales structure of the Dutch pig industry.

**Figure 3.9: Sales structure of the pig sector in the Netherlands, 1999.**



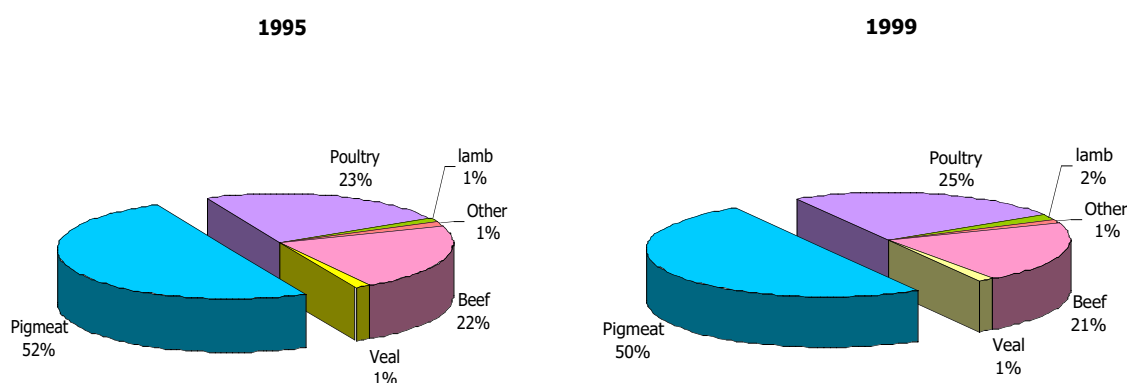
Source: Product Board for Livestock, Meat and Eggs, (2000).

## CONSUMPTION

The Netherlands had a relatively high level of per capita consumption, at 43.7kg per head in 1999. Because of the relatively small population, overall consumption is relatively low in European terms reaching 0.68 million tonnes in 1999.

In recent years, in spite of the increase of the Dutch population, meat consumption has remained static. Total meat consumption stood at 87.8kg per head in 1999. Pork is the most consumed meat and is a very price-sensitive product. Poultry meat is the only meat of which consumption has increased, from 20.4kg in 1995 to 21.9kg per head in 1999 (see Figure 3.10).

**Figure 3.10: Total meat consumption in the Netherlands, 1995 and 1999.**



Source: Product Board for Livestock Meat and Eggs, 2000. (\*Other: horse meat and other edible slaughter products).

## TRADE

The Netherlands had a self-sufficiency of 268 percent in 1999 making the industry there very reliant on exports. In 1999 pigmeat exports reached 1.05 million tonnes. The EU is the main market for Dutch pigmeat accounting for about 90 percent of exports. Germany at 31 percent and Italy at 24 percent are the two main European destinations. The major destination for live piglets and slaughter pigs is Germany, which accounts for 42 and 75 percent of these animals respectively.

**Table 3.11: Destination of Pork Exports from the Netherlands in 1999\***

Destination	Amount (tonnes)	Percentage of Exports
Germany	250,170	31
Italy	193,680	24
France	80,700	10
Greece	80,700	10
Belgium/Luxembourg	32,280	4
UK	32,280	4
Spain	16,140	2
Other countries	121,050	15
<b>Total</b>	<b>807,000</b>	<b>100</b>

Source: Product Board for Livestock, Meat and Eggs, 2000.\* Excluding meat products, cooked products, preserved products, bacon.

## STRUCTURE OF THE PORK INDUSTRY

### Quality Guarantee

Consumers of pork are increasingly demanding guarantees as to the way in which pork is produced. The Dutch pig industry is able to meet those demands by means of their system Integrated Quality Control (IKB - Integrale Keten Beheersing). The IKB system ensures traceability and offers guarantees on meat safety. The integrated system means that all the parts of the production chain are linked to one another based on an exchange of information from farmers to retailers and consumers. This system was introduced in 1992. When it began there were 11 slaughterhouses and 500 pig farmers producing 1 million IKB pigs. In 1998 almost 90 percent of slaughterhouses in the Netherlands were part of the IKB system. Since September 1995, fresh meat processing firms, butchers and supermarket chains have also been part of the IKB system.

The Dutch pork industry has developed into a market-driven industry and the IKB system provides the infrastructure where changes can be introduced relatively easily. Currently the pork sector is working on additional IKB guidelines including animal welfare and environmental aspects.

Participation in the IKB system is voluntary. Pig farmers and traders who register for the IKB system, after an initial admittance inspection, are allowed to use the IKB logo which is a quality mark that makes IKB meat recognisable (Figure 3.11).

**Figure 3.11: IKB quality mark**



### **Free-range pork**

In the Netherlands a number of companies use their own quality programmes as well as the IKB system. As a result they offer additional guarantees. A special scheme for free-range pork has been in operation since 1996. In 1999 there were almost 70 free-range pig farms and 41,000 free-range pigs were slaughtered. The production of free-range pork is directed to the domestic market.

The IKB scheme for free-range pigs is supported by the Dutch National Consumers' Organisation, the RSPCA (Royal Society for the Prevention of Cruelty to Animals), the Association for Environmental Defence ('Vereniging Milieudefensie') and the Dutch Association of Free-Range Pig Farmers ('Nederlandse Vereniging van Scharrelvarkenshouders'). The IKB free-range pork is recognisable by a special PVE/IKB free-range quality mark.

### **ANIMAL WELFARE REGULATIONS**

The Dutch pork industry fulfils the European Union legislation on the protection of animals through the *Animal Health and Welfare Act* (Gezondheids-en Welzijnswet voor dieren), in force since 1992 and the *Pig Farming Decree* ('Varkensbesluit') in force since 1996 (and last changed in 1998). The *Pig Farming Decree* is a national regulation that has been introduced to implement the Council Directive 91/630/EEC. The 'Varkensbesluit' contains additional measures relating to animal welfare that go beyond EU legislation.

The legislation applies to all farms keeping pigs and the welfare requirements cover all aspects of the production chain.

#### **Farm level**

Group housing units are replacing traditional systems where sows are housed individually. Houses built after 1998 must provide group housing where sows are allowed to move freely. Only boars may be housed individually and temporary individual housing is allowed only for sows with a litter and for health or conception reasons. Pig farmers with pig houses built before 1998 have until the 1 January 2008 to implement the new housing requirements, although market requirements and



retailer demands are forcing pig farmers to comply with the legislation before the deadline.

Further requirements refer to the construction or conversion of installations in which sows and gilts are tethered. These installations are prohibited after 31 December 1995. However, a transitional period applies until 1 January 2002 as stipulated by the Council Directive 91/630/EEC. Also the EU Directive requires that all pigs must have access to straw to prevent tail-biting and other vices.

Table 3.12 shows that Dutch housing requirements on the size of pens and the space available for pigs are stricter than those imposed by European Legislation.

**Table 3.12: Minimum available floor area for various categories of pigs**

category:	minimum floor area	
	EU Directive	Dutch legislation
Pigs up to 10 kg	0,15 m <sup>2</sup>	0,4 m <sup>2</sup>
Pigs from 10 to 20 kg	0,2 m <sup>2</sup>	0,4 m <sup>2</sup>
Pigs from 20 to 30 kg	0,3 m <sup>2</sup>	0,4 m <sup>2</sup>
Pigs from 30 to 50 kg	0,4 m <sup>2</sup>	0,6 m <sup>2</sup>
Pigs from 50 to 85 kg	0,55 m <sup>2</sup>	0,8 m <sup>2</sup>
Pigs from 85 to 110 kg	0,65 m <sup>2</sup>	1,0 m <sup>2</sup>
Pigs over 110 kg	1,0 m <sup>2</sup>	1,3 m <sup>2</sup>
Sows in group housing	-	2,25 m <sup>2</sup>
Sows with litter	-	1,3 m <sup>2</sup> +0,6m <sup>2</sup> *solid floor for piglets
Boars aged up to 12 months	-	4 m <sup>2</sup>
Boars aged 12 to 18 months	-	5 m <sup>2</sup>
Full-grown boars	6 m <sup>2</sup>	6 m <sup>2</sup>
Full-grown boars in pig house that also serves as service stocks	6 m <sup>2</sup>	7 m <sup>2</sup>

Source: Netherlands Meat Board, (1999) \*in the Netherlands approximately 4m<sup>2</sup> is always available in practice, with the sow being kept in the 1.3m<sup>2</sup> stall.

Besides the guidelines on space requirements, Dutch legislation includes the design of the floor and the lighting and climate in the pig houses. For instance all pig houses have central heating and mechanical ventilation which is usually controlled by computer. Pigs have a narrow thermo-neutral zone<sup>1</sup>, so it is well understood that an inadequate environment has an impact on the health and performance of pigs, with a subsequently deterioration on the quality of meat.

Other measures to optimise the welfare of pigs at the farm level are summarised in Table 3.13.

**Table 3.13: Animal welfare legislation at farm level**

<b>GUIDELINES:</b>	
<b>Weaning:</b>	piglets may not be weaned until they are at least three weeks old.*  One week after weaning, strange piglets may no longer be mixed together to prevent hierarchy fights.
<b>Surgeries:</b>	castration of male pigs without anaesthetic is not allowed over 4 weeks old.  It is prohibited to cut pigs' tails and clip their teeth. Where tooth clipping appears necessary this shall be only be carried out within seven days of birth.*
<b>Floors:</b>	Partially slatted floors are allowed in farrowing pens provided a part of the floor is solid.  From 1 January 2002 concrete slatted floors are no longer allowed. The solid part of the floor must be covered with a rubber mat or be littered with straw, hay, wood chips, sawdust, compost, peat or a mixture of these.
<b>Other:</b>	Separate nesting place is set up for the piglets to prevent the sow from crushing them.  Sick or injured pigs must be treated in a separated area provided with bedding

*Source:* Dutch Meat Board (1999)/ Ministry of Agriculture, Nature Management and Fisheries (2000).  
*Note:\** In accordance with Council Directive 91/630/EEC.

### **Transport of animals**

In order to avoid stress during transport the Netherlands has a set of regulations that comply with European legislation on the transport of animals<sup>2</sup> and an additional set of

<sup>1</sup> The thermo-neutral zone is the range of environmental temperature over which heat loss by the pig is minimal and independent of environmental temperature.

<sup>2</sup> Council Directive 95/29/EC amending Council Directive 91/628/EEC

regulations which is a quality regulation. Both are fully integrated into the IKB quality system.

The quality regulations are based on the ISO-9002 system and it requires transport companies to set down their activities and procedures in a manual. It also stipulates additional requirements on hygiene and cleaning the tailboard, handling pigs during transport and measures in event of bad weather. Once the animals have left the farm their welfare is the driver's responsibility. The drivers are trained to carry out their job ensuring that they know how to deal with live animals and how to handle them.

Feed is withheld for 12 hours prior to departure to prevent travel sickness, although water remains available. The maximum length of journey is 4 hours, however most pigs arrive at the slaughterhouse within 2 hours.

### **Slaughterhouse**

The quality regulations governing the transport of livestock also cover unloading the pigs at the slaughterhouse. Table 3.14 summarises some general requirements.

**Table 3.14: Some general requirements to take care of the animals welfare at the slaughter plants in the Netherlands.**

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#### **REQUIREMENTS:**

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Slaughterhouses must be adequately equipped to unload animals

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On arrival animals must be unloaded as quickly as possible

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Animals must be separated according to origin

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Animals must be protected from extreme weather conditions

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If kept at the slaughterhouse for more than a few hours, the condition and health of the animals must be checked every morning and evening at least

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Suffering must be kept to a minimum

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A pig ambulance must be on hand for animals unable to walk

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*Source:* Dutch Meat Board, (1999).

Pig slaughterhouses are also required to have sufficient facilities to allow pigs to rest before being slaughtered. It is very important that the animals are calm before they are taken to the stunning unit. The use of electric goads is forbidden and only stunning by electricity and CO<sub>2</sub> are permitted.

## **ENVIRONMENTAL REGULATIONS**

The Netherlands is one of the most densely populated countries in terms of people and livestock and also has a high water table. This has led to serious environmental problems, mainly ground water pollution and eutrophication of surface water. In order to improve the state of the environment the Dutch government has developed a formal environmental policy that has been carried out for the past 25 years.

In the Netherlands pig husbandry is the most intensive livestock sector producing a surplus of manure in most cases. Therefore, the environmental measures mainly focus on manure production and emissions of ammonia, phosphates and nitrates.

Any commercial pig unit in the Netherlands needs to have an environmental permit. This permit specifies the regulations that farmers have to comply with, the layout of the farm and the number of animals permitted.

In response to the European *Nitrates Directive*<sup>1</sup> the Government intends to lower the permitted amount of fertilisers applied per hectare. Farmers who have a surplus of manure would have to enter into manure disposal contracts with arable farms or arrange for the manure to be disposed of outside the agricultural sector or abroad.

An alternative to manure redistribution is manure reprocessing. Manure reprocessing can reduce the moisture content of the manure making a more suitable product to be transported and to compete with artificial fertilisers. However, manure reprocessing has turned out to be a very expensive alternative, due to the high costs involved in

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<sup>1</sup> Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources.

development of new technology, treatment processes and the difficulty of finding markets for the processed manure.

Table 3.15 summarises the rules and measures applied at farm level by the Dutch government to protect the environment.

**Table 3.15: Summary of environmental regulations and measures in the Netherlands.**

<b>Summary:</b>	
<b>Minerals accounting</b>	Is an input-output book-keeping system that relates total application of fertilisers to production. Farms with more than 2.5 LU/ha must report mineral losses. In 2002 this limit will be reduced to 2 LU/ha.
<b>Loss standards</b>	Set a maximum permitted mineral loss into the environment considering the mineral input and removal, such as mineral uptake by crop. The standard is 40kg/ ha phosphate and 300kg/ha nitrogen. In 2008 this will be lowered to 20kg/ha phosphate and 180kg/ha nitrogen
<b>Spreading of animal manure</b>	Prohibited in autumn and winter between: 1 September - 1 February on leaching-prone grassland or arable land. From 15 September for non-leaching prone grassland.
<b>Ammonia policy</b>	The objective is to reduce emission by 70% between 2000 and 2005 compared to 1980. The ways to achieve this reduction focus on low-emissions manure spreading techniques such as: deep injection, shallow injection and spreading harrows. Low-emission housing is the other alternative, although more expensive.
<b>Phased feeding</b>	The use of feeding programmes that are specifically formulated to satisfy the demands of a particular group of animals improves the utilisation of feed and reduces emissions of minerals, ammonia, and amount of manure. Phosphate and nitrates have been reduced in most pig feedstuffs and to limit the excretion of phosphate, extra phytase has been added.

## **THE UNITED KINGDOM**

The United Kingdom accounts for around 6 percent of pig production in the EU, although the country's large population means it is the fifth largest market in the EU.

In 1998 and 1999 the British pig industry experienced a crisis. Pig prices were below the costs of production leaving an impact at all levels of the production chain, from producers to suppliers. A substantial increase in production and supplies relative to the level of consumption resulted in a collapse in prices in the EU market.

Extra costs due to welfare legislation and the BSE tax also weakened the industry's competitive position. The BSE tax was imposed on producers as a result of measures introduced to control BSE in cattle. In addition to these extra costs, in 2000 the British pig industry was affected by an outbreak of Classical Swine Fever. The competitive position of the UK pig industry was also adversely affected by the relative strength of sterling in 1999 and 2000.

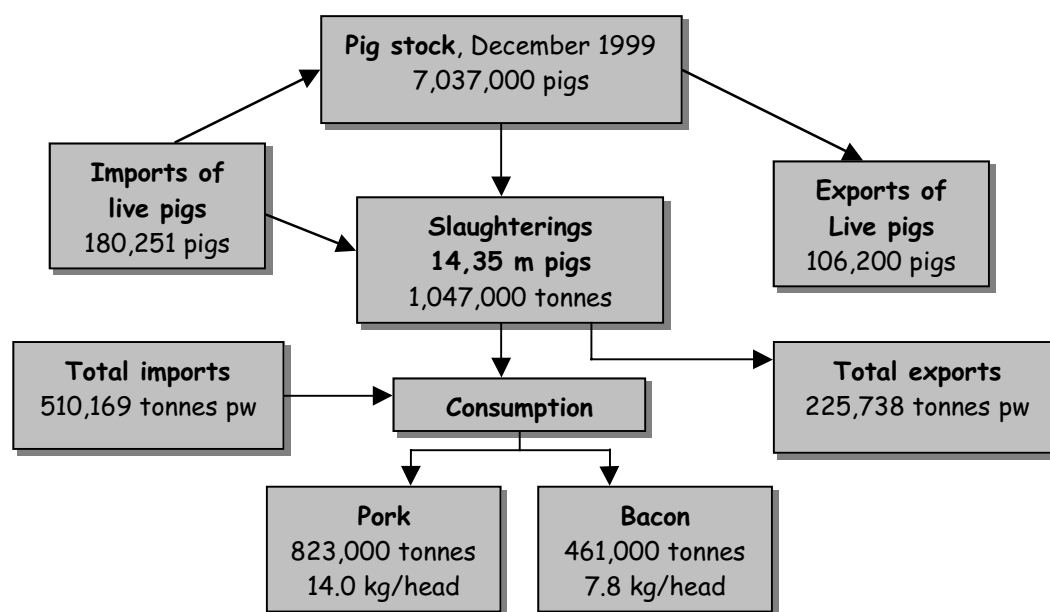
### **PRODUCTION**

Half of UK pig production is located in Eastern England with the majority of pigs concentrated in the Yorkshire & Humberside and East Anglia regions. The majority of pigs are finished in intensive indoor buildings, but the UK has the EU's largest outdoor herd, accounting for more than 30 percent of breeding sows.

Pig production is concentrated in the hands of declining number of producers. In 1999 there were about 14,000 pig holdings, representing 6 percent of total agricultural holdings. With a population of 7 million pigs in 1999, the pig herd has declined over 2.8 percent and the number of breeding sows by over 7.4 percent since 1996.

Figure 3.12 summarises the sales structure of the British pig industry. The United Kingdom produced 14.4 million slaughter pigs in 1999 with an average carcass weight of 69kg, resulting in slaughtered production of 1.05 million tonnes.

**Figure 3.12: Sales structure of the pig sector in the UK, 1999.**



Source: MLC, 2000; MAFF, 2000.

## CONSUMPTION

Pigmeat consumption at 21.8kg per capita in 1999 was made up of 14kg fresh pork and 7.8kg bacon (see Table 3.16). In the UK, the market for pig meat and for meat in general has not grown. During the 1990's pig meat consumption per capita increased only slightly. Figure 3.13 shows that the market share of pig meat in 1999 was less than poultry meat.

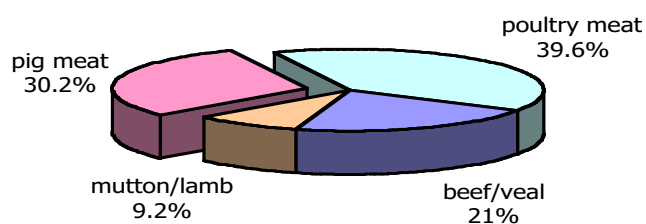
On an EU wide basis overall UK consumption, at almost 1.3 million tonnes, is the fifth highest in the community. However, compared on a per capita basis pigmeat consumption is the lowest of all the EU Member States, with the exception of Greece.

**Table 3.16: Pork and Bacon Consumption in the United Kingdom, 1999.**

	<b>PORK</b>	<b>BACON</b>
Total consumption ('000 tonnes)	822.8	470.0
Self-sufficiency (%)	100.8	49.5
Per capita consumption (kg/year)	14	7.8

Source: MLC, 2000.

**Figure 3.13: Market share for different meats in the UK (volume terms), 1999.**



Source: MLC, 1999.

## TRADE

About one quarter of the UK market is supplied by imports. As shown in Table 3.17, total imports at around 510,000 tonnes are mainly in the form of bacon and ham from the Netherlands and Denmark. Fresh and frozen pig meat is imported from Denmark, the Netherlands, Ireland and France (Table 3.18).

**Table 3.17: Volume of total pig meat imports**

(tonnes, product weight)	1999
Fresh/frozen	197,250
Bacon and ham	229,327
Sausages	44,142
Processed products	39,450
<b>Total</b>	<b>510,169</b>
Live pigs	180,251

Source: MLC, 2000.

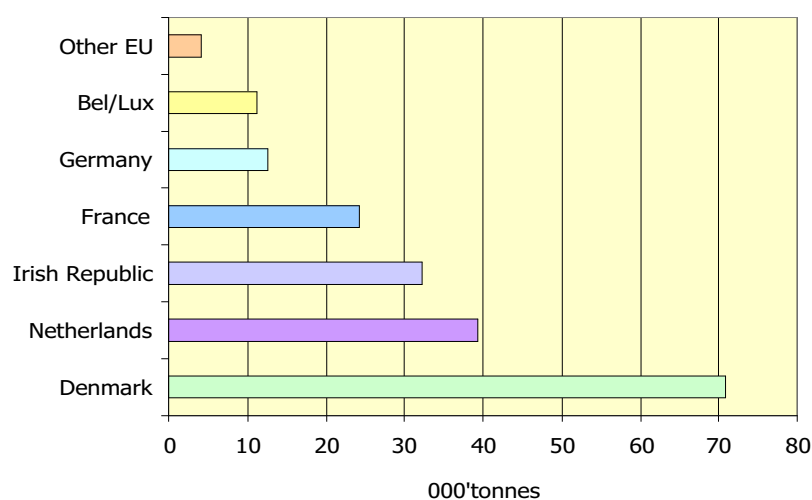


**Table 3.18: Pigmeat imports to the UK, 1996 to 1999.**

(000 tonnes)	1996	1997	1998	1999
<b>Bacon and ham Of which:</b>	<b>264.5</b>	<b>236.8</b>	<b>232.6</b>	<b>229.3</b>
Denmark	110.6	117.0	106.4	96.4
Netherlands	127.7	98.5	107.2	111.9
Ireland	8.4	8.0	6.9	8.0
Germany	5.4	4.9	5.3	1.8
France	7.8	6.1	4.5	8.9
Other EU countries	4.6	2.3	2.3	2.3
Total Bacon Imports:				
<b>Pork total (fresh/chilled and frozen) Of which:</b>	<b>150.1</b>	<b>139.2</b>	<b>151.4</b>	<b>197.3</b>
Denmark	50.3	46.1	56.0	70.9
Ireland	30.9	29.3	32.0	32.2
France	27.1	28.5	24.7	24.3
Netherlands	20.1	16.5	21.0	39.3
Bel/Lux	11.1	6.7	5.9	11.1
Germany	5.3	6.1	7.8	12.6
Other EU countries	4.2	4.3	1.3	4.0

Source: MLC Yearbook, 2000.

Figure 3.14 illustrates the relative importance of Denmark, the Netherlands and Ireland as the main suppliers of pork to the UK market.

**Figure 3.14: Imports of pork into the UK by country of origin, 1999.**

Source: MLC, UK Handbook.

Total pigmeat exports in 1999 were estimated at 207,347 tonnes. As shown in Table 3.19, the main European destination for UK exports is Germany. Table 3.20 shows the composition of total pigmeat exports. The largest volume of exports is fresh and frozen pork exported mainly to Germany.

**Table 3.19: Pig meat exports from the UK by destination**

(tonnes)	1998	1999	% change
<b>EU Of which:</b>	<b>214,686</b>	<b>175,723</b>	<b>-18</b>
Denmark	9,481	5,054	-47
Greece	727	404	-44
Sweden	1,119	672	-40
Italy	23,974	15,038	-33
Portugal	7,594	5,576	-27
Germany	81,275	67,623	-17
The Netherlands	41,078	34,498	-16
France	24,131	20,572	-15
Ireland	10,496	10,168	-3
Bel/Lux	13,862	14,494	5
Spain	891	1,505	69
Other EU	58	119	>100
<b>Non EU Of which:</b>	<b>33,367</b>	<b>31,624</b>	<b>-5</b>
Hungary	4,392	1,427	-68
Hong Kong	7,392	4,727	-36
Poland	4,842	3,891	-20
United States	3,978	3,900	-2
Japan	5,356	5,531	3
South Africa	1,169	1,211	4
Other non EU	5,183	9,147	76
South Korea	45	452	>100
<b>TOTAL</b>	<b>247,381</b>	<b>207,347</b>	<b>-16</b>

Source: MLC Yearbook, 2000.

**Table 3.20: UK Pig meat Exports, 1998 and 1999.**

('000 tonnes)	1998	1999	% change
Fresh/frozen meat	247,381	207,347	-16
Bacon and ham	6,617	6,330	-4
Sausages	2,934	4,671	5
Processed products	7,741	7,390	-5
<b>TOTAL</b>	<b>264,673</b>	<b>225,738</b>	<b>-15</b>

Source: MLC Yearbook, 2000.

### **Trade between the United Kingdom and Ireland**

The United Kingdom is Ireland's largest export market for pig meat accounting for half of total exports. Between 1990 and 1999 the volume of Irish exports to the UK more than doubled reaching 72,000 tonnes in 1999. Ireland's biggest competitors supplying the British market are Denmark and the Netherlands. Both countries have a highly specialised and export orientated pig industry, but Ireland's proximity and product similarity to the UK can be seen as a competitive advantage.

### **STRUCTURE OF THE PORK INDUSTRY**

The pig sector is very concentrated. In the decade up to 1999 the number of abattoirs in the UK killing pigs has declined from 700 to 272. Slaughterings have remained the same, therefore the average annual throughput has more than doubled. The number of specialist pig abattoirs<sup>1</sup> has also declined sharply. In 1999, 28 were classified as specialist pig abattoirs. The specialist pig plants are located in the Eastern and Northern, Lancashire/Yorkshire regions where most of the pig production is concentrated. Although specialist abattoirs only represented 10 percent of plants slaughtering pigs, they accounted for over 70 percent of the national kill in the UK.

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<sup>1</sup> Defined as those where pigs account for 95 percent of throughput.

### **Grading and payment system**

In the UK there are individual contracts between producers and processors. These contracts generally incorporate schedules by which price is related to quality attributes objectively measured at the abattoir. Another feature of the pig purchase contracts is the use of an average pig price, independently calculated and published by the Meat and Livestock Commission (MLC), this price forms the basis of price determination which is usually done weekly.

The Meat and Livestock Commission (MLC) has been classifying pig carcasses throughout Great Britain since 1971. The information provided by the Pig Carcase Authentication Service is used widely as the basis for transactions between producers and slaughterers. The service incorporates all of the mandatory requirements of the EC Pig Carcase Grading Scheme which was introduced in Great Britain in 1989. In 1999 the MLC classified 72 percent (10.6 million pigs) of the national kill (MLC, 2000).

### **Quality Guarantee**

Since the BSE crisis consumers have become more conscious of the importance of food safety, production techniques and traceability. In order to promote consumer confidence in beef, lamb and pork, Assured British Meat (ABM) was launched in 1998. ABM is an independent food industry initiative set up to establish a safety assurance framework for the entire supply chain from manufactures of feed-stuffs and on-farm production to abattoirs and retailers.

On behalf of ABM, the Meat and Livestock Commission (MLC) launched the new British Meat Quality Standard Mark in 1999. The “quality standard for pig meat” logo aimed to differentiate British meat and communicate its qualities to consumers, enhancing attributes such as high welfare and quality feeding systems. This is one of the main elements of the new Strategic Plan launched in 1999 by the British Pig Executive (BPEX), which intends to improve the competitiveness of the sector.

**Figure 3.15: Quality Standard Mark**



In Great Britain, the other main Pig Quality Assurance Scheme is “Freedom Foods” managed by the Royal Society for the Prevention of Cruelty to Animals (RSPCA). About 1,000 herds belong to this scheme, of which 98 percent are outdoors. Northern Ireland has its own scheme “The Northern Ireland Pig Quality Assurance Scheme” administered by the Ulster Farmers’ Union.

### **ANIMAL WELFARE**

The UK is leading other EU countries with concerns about animal welfare. Statutory provisions for the welfare of livestock were introduced in the *Agriculture (Miscellaneous Provisions) Act 1968*. This Act gave power to Ministers to make mandatory regulations on welfare matters and issue *Codes of Welfare Recommendations* for the guidance of stockmen and others responsible for livestock.

#### **The Code of recommendation for the welfare of pigs**

Welfare Codes are intended to encourage stock-keepers to adopt the highest standards of husbandry. The Code makes general recommendations about different aspects of pig production. It makes reference to:

- Housing,
- Ventilation and temperature,
- Fire and other emergency precautions,
- Lighting,
- Mechanical equipment and services,
- Feed and water, and
- Management.

### **Farm level**

Among the legislation made under the *Agriculture (Miscellaneous Provisions) Act 1968* and currently in force are the *Welfare of Livestock Regulations 1994 (SI 1994 No. 2126)*. They contain separate Schedules concerning different kind of livestock. Schedule 3 is concerned with pigs.

The Schedule also implements the *EC Directive 91/630* which lays down minimum standards for the protection of pigs. New requirements on space allowances for weaners and rearers were introduced by this Directive and came fully into force on 1 January 1998.

One of the main differences from the European legislation is that the Schedule banned the installation of new close confinement stalls and tether systems from 1 October 1991. As part of the phasing-out arrangements, systems already in use on that date were allowed to continue in use until 1 January 1999 when all such systems were banned. Tethers may not be used after that date for any longer than is necessary for a specific purpose (e.g. for veterinary treatment). In the rest of the EU such systems are allowed until 2005 (for the detailed Schedule see Appendix B).

### **Transport of Animals**

The EU rules governing animal welfare in transit are set down in the Directive 95/29/EC. This is implemented in Great Britain by the *Welfare of Animals (Transport) Order 1997*. As well as providing for EU-wide maximum journey times, feeding and watering intervals, and proper rest periods for animals to recover from journeys, the rules give strengthened enforcement powers through, for example, authorisation of transporters and route plan requirements (MAFF, 1999).

### **Slaughter of Animals**

The *Welfare of Animals (Slaughter or Killing) Regulations 1995 (SI 1995 No731)* established different regulations concerning the slaughter of animals. These regulations implemented in Great Britain the rules set down in Directive 93/119/EC on the protection of animals at the time of slaughter or killing.

These regulations pay particular attention to stockmanship in relation to the handling, stunning, slaughter or killing of animals. In particular anyone carrying out any of these tasks must have the knowledge and skill to do their job humanely and efficiently. Slaughtermen must be competent and hold a Registered Licence and in every slaughterhouse a competent person must be given authority to take action to safeguard welfare and only permitted methods may be used to stun or kill animals (MAFF, 1999).

## **ENVIRONMENT**

The United Kingdom is much less densely populated in terms of people and livestock than the Netherlands or Denmark. Nevertheless, significant levels of nitrates and phosphates are found in the rivers and some ground water supplies (Leuck, 1993, p.7).

In the UK, nitrate pollution of ground water is seen as the major problem, even though large regional variations occur. High nitrate concentrations are primarily found in the Eastern and Central parts of England (Rude and Frederiksen, 1994). Also, several water supplies are in breach of the EC Drinking Water Directive and exceed the 50 mg/l limit.

Most freshwater eutrophication is limited by phosphate rather than nitrate, although both nutrients must be present for it to occur. Eutrophication has not been a major issue of concern in the UK compared to other European countries. However, high nutrient levels are found in most lowland rivers and lakes in the UK and severe eutrophication affected certain bodies of open water (Baldock and Bennett, 1992).

In the UK, legislation regarding agricultural pollution problems is included in the *Water Act* (1989). Under this Act, it is an offence to cause or knowingly permit a discharge of poisonous, noxious or polluting matter or solid matter to any “controlled water”. In this context “controlled waters” include groundwater, inland fresh water and coastal water (Baldock and Bennett, 1992).

Also, this Act introduced mandatory standards for the construction of slurry stores, silage stores and agricultural fuel oil stores. It regulates the installations of new systems as well as enlargements of existing systems (Rude and Frederiksen, 1994).

### **Code of Good Agricultural Practice**

In July 1991, the Ministry of Agriculture, Fisheries and Food published the “*Code of Good Agricultural Practice for the Protection of Water*”. Through the Code, the Ministry of Agriculture, Fisheries and Food gave information on how to control pollution from animal waste. The government supports equally all options of controlling excessive nitrate pollution. It views it as the responsibility of each producer to respond to the regulations using the options that seem most appropriate (Brouwer *et al*, 1999).

### **Nitrate Sensitive Areas (NSA) and Nitrate Vulnerable Zones (NVZ)**

Only few regulations directly address nitrate problems. The main policy programme enacted by the UK Government has been the 1990 *Nitrate Sensitive Areas Pilot Scheme*, which aims to tackle the problem of unacceptable levels of nitrate leaching from farmland into water sources (Rude and Frederiksen, 1994). Since 1994 this Pilot Scheme has been enlarged by a new *Nitrate Sensitive Areas (NSA) Scheme*. This voluntary Scheme compensates farmers for significantly changing their farming practices to help protect valuable supplies of drinking water.

The Nitrate Sensitive Areas Scheme operates in 32 selected areas in England under the EC agri-environment measures. The 32 Nitrate Sensitive Areas, including 10 former Pilot areas designated in 1990, cover approximately 35,000 hectares of eligible agricultural land. All of the NSAs fall within the 68 areas covering some 600,000 hectares designated as *Nitrate Vulnerable Zones (NVZs)* under the EC Nitrate Directive (91/676/EEC). Farmers in nitrate vulnerable zones are required to comply with a Mandatory Action Programme (MAFF, 1999b).

Each area in a NVZ has been identified as containing land which drains directly into watercourses and where nitrate concentration in water exceeds or could exceed 50mg per litre. MAFF introduced the measures to cover NVZs in December 1998,



accompanied by a 12 month leeway. The Environment Agency is in charge of the enforcement of these measures (Forum, 1999).

**Table 3.21: Summary of compulsory requirements for farmers located in Nitrate Vulnerable Zones in the UK:**

<b>Most important features:</b>	
<b>Application of manure</b>	<p>The total nitrogen application from organic manure should not exceed:</p> <ul style="list-style-type: none"> <li>- An average 210kgN/ha/year on arable land across the area of the farm</li> <li>- An average 250kgN/ha/year on grassland across the area of the farm</li> <li>- By December 2002, the total organic nitrogen applied on arable land must not exceed 170kgN/ha/year.</li> </ul>
<b>Spreading of animal manure</b>	<p>Closed periods for applications are as follows:</p> <ul style="list-style-type: none"> <li>- Arable: 1 August- 1 November</li> <li>- Grassland: 1 September- 1 November (including arable land with autumn sown crop)</li> </ul> <p>It is also stated that organic manures or nitrogen fertilisers must not be applied:</p> <ul style="list-style-type: none"> <li>- when soil is waterlogged, flooded, frozen hard or snow covered</li> <li>- to steeply sloping fields</li> <li>- in a way that contaminates water courses</li> <li>- within 10 metres of water courses</li> </ul> <p>and it must be spread evenly and accurately.</p>
<b>Capacity to store animal manure</b>	<p>There must be sufficient storage to meet the autumn closed period for spreading slurry. All new or substantially enlarged or reconstructed storage facilities must comply with the relevant regulations. Grants are available for new or improved waste facilities.</p> <p>Although there is no specific demand beside construction advice, the Code recommends minimum storage capacity equal to 4 months in England and Wales and 6 months in Scotland</p>
<b>Record keeping</b>	<p>Adequate farm records must be kept covering cropping, livestock numbers and the use of nitrogen fertilisers and organic manures. These records must be available at all reasonable times for inspection by the Environment Agency.</p>

### **Integrated Pollution and Control**

*The Environmental Protection Act (1990)* brings in a system of integrated pollution control for the disposal of wastes to land, water and air. The act tries to tighten the polluter-pays-principle by incorporating “Duty of care” standards for waste handling.

### **Integrated Pollution Prevention and Control (IPPC)**

This Directive (96/61/EC) is designated to prevent, reduce and eliminate pollution at source through the prudent use of natural resources. New and substantially changed existing pig units will need to get a permit in order to operate from October 1999 onwards. Existing units will have to be phased in before 2007.

Pig producers will need to adopt best available techniques to reduce emissions, including ammonia and hydrogen sulphide, to the air, land and water. It is estimated that IPPC will affect more than 400 pig units in England and Wales, accounting for 13 percent of sows and 40 percent of finishing pigs.

## **CHAPTER FOUR**

### **Cost Comparison Model**

#### **INTRODUCTION**

The model constructed in this chapter is designed to examine the comparative cost position of the Irish pigmeat industry within the EU for the year 1999.

Costs of production for Ireland, United Kingdom, Denmark, and the Netherlands are compared. A cost comparison model was developed to compare the costs involved in the selected countries.

This chapter outlines:

- (i) Sources of information;
- (ii) Constraints on inter-country comparison;
- (iii) Options considered for comparison;
- (iv) Components and definitions of the model; and
- (v) Definitions of production costs.

#### **SOURCES OF INFORMATION**

The majority of the data was sourced from institutes and industry experts.

##### **Denmark:**

The source of the Danish production costs was from Danske Slagterier (The Federation of Danish Pig Producers and Slaughterhouses). The data is based on 60 percent of the total pig farms. The average herd size was 218 sows.

##### **The Netherlands:**

Dutch production costs were derived from the Praktijkonderzoek Varkenshouderij (Research Institute for Pig Husbandry).

**The United Kingdom:**

Production costs for the UK were sourced from the Meat and Livestock Commission's Signet Pigplan Recording and Costing Service.

**Ireland:**

Irish cost data was sourced from the Teagasc Pig Advisory Service, based on the Pigsys Data Analysis. Feed costs are the average of 89 integrated herds and non-feed costs are based on 67 integrated herds.

**CONSTRAINTS ON COMPARISON**

The lack of comparative analysis to estimate the competitiveness between countries is due to two main constraints (1) lack of reliability of data and (2) the non-homogeneous nature of the product.

**Unreliability of Data**

Van de Ven and Corning (1989) and van de Ven and van den Elezen (1990) drew attention to the difficulties for comparing the performances within EU countries because of differences in calculations, definitions and rules used to elaborate the national averages published. An example is the definition of a sow, which varies greatly between countries. For example the 'presence time' of a sow can be defined by the following events: Entry: introduction into the herd **or** 200 day age **or** time of first mating; Exit: last weaning **or** cull.

**A Non-Homogenous Product**

It is difficult to compare pig costings between countries as pigs tend to be produced and processed to different specifications. The different requirements of each market have led to differences in the average carcass weight of pigs produced in each country. Thus, despite the introduction of the Single Market, the market for slaughter pigs remains largely separated geographically by country.

## **OPTIONS CONSIDERED**

Pigmeat is produced and traded both as carcasses and more commonly as cuts. Two model options arose from this, namely whether to model the cost of producing cuts or the cost of producing a whole carcass.

### **Representative Cuts**

Information on identifying cuts of pork is not widely available because each country has different cutting practices to divide the pig into saleable portions. Further, it was found that even when cutting practices are similar, cuts are identified by different names in different countries. Two cuts which have similar characteristics and could be compared are loins and hams.

### **Whole Carcass**

A comparison of the production costs of a whole carcass was the option selected, as it assesses relative competitiveness more accurately than choosing representative cuts. This looks at the total cost involved of producing a whole carcass. Pigs are slaughtered at different weights, so to overcome this, comparison between countries is made on a per kg deadweight basis.

The main problem associated with this model is that most trade is in fact in the form of cuts and there is little trade in carcasses. The model does not take into account the quality of meat and it makes the assumption that a farmer will receive the same price per kg no matter how heavy the carcass is. In practice payment per kg is always adjusted for percentage lean meat and as the liveweight at slaughter increases the amount of fat in the carcass increases and the percentage lean meat decreases.

## COMPONENTS OF MODEL

The cost comparison model developed for this study includes:

### Cost Comparison Model:

#### 1. Average Pig:

- Average liveweight of pig (kg).
  - Kill out percentage (%).
  - Average carcass weight (kg).
- 

#### 2. Farm Production Costs:

- Feed costs
- Labour costs
- Other costs

#### 3. Total Costs

- Per Pig
- Per kg deadweight

#### **Average pig**

Within each country the pig is examined under 3 headings, average liveweight (kg), kill out percentage and average carcass weight (kg).

- **Average liveweight of pig (kg)**

This is the weight of the pig before it is slaughtered. Wide variations occur within the chosen countries. These differences between countries reflect the type of pig required by the market and also whether males are slaughtered entire or castrated.

**Table 4.1: Average liveweight of pigs, kg.**

Country	Kg
Ireland	90.5
United Kingdom	90.0
Denmark	100.8
The Netherlands	112.2

These variations in liveweight make comparisons between countries more difficult. To facilitate these variations, the cost per pig and also a cost per kg deadweight are chosen for comparative purposes.

Slaughter weights have been increasing steadily in recent years. This reflects changes in the product mix for which pig carcasses are used. The percentage of carcasses used for curing has decreased with a corresponding increase in the percentage used for processed products.

In factories it is normal that a price penalty applies for pigs falling outside a designated weight range. Pig carcasses above the minimum weight are required to produce cuts large enough to meet market requirements and to minimise processing costs per kg. The upper limit relates largely to the risk of boar taint or odour in heavier carcasses and also to consumer preference for smaller cuts such as rashers or pork chops.

As pig slaughter weight is increased *Finisher Feed Conversion Efficiency* deteriorates, *Kill Out Percentage* improves but *Lean Meat Percentage* is likely to deteriorate. Both feed costs and labour costs per pig are increased. However, these increased production costs are likely to be more than offset by improved pig price. This is due to the higher slaughter weight achieved despite a lower average price per kg due to lower Lean Meat Percentage.

The most recent evaluation of the effect of slaughter weight on Food Conversion Efficiency, Killing Out Percentage and Lean Meat Percentage for Irish pigs is provided by the results of trials completed in 1992.

**Table 4.2: Effect of each 1kg increase in liveweight at slaughter on various pig performance parameters.**

Parameter	Effect
Finisher Food Conversion	- 0.01
Kill Out %	+ 0.067
Lean Meat %	- 0.055

*Source:* Lynch and Allen, 1992.

These figures indicate that for a 10kg increase in liveweight at sale there would be a deterioration in finisher FCE of 0.1; an improvement of 0.67 percentage points in Kill Out and a deterioration of 0.55 percentage points in Lean Meat content.

- **Killout Percentage**

This is the average carcass weight divided by the average liveweight of the pig multiplied by one hundred. As the liveweight of the pig increases the kill out percentage improves.

**Table 4.3: Typical yields of by-products, per pig, kg.**

Rind	4.9
Bristles	0.3
Lungs	0.4
Spleen	0.1
Stomach (empty)	0.6
Stomach (contents)	0.3
Blood (carcass)	2.6
Intestines (empty)	2.8
Intestines (contents)	2.1
Bone	7.4
Fat tissue	9.7
Other	1.8
Total Waste	33.0
Average EU liveweight	107.0
% waste	30.8

*Source:* Weiners W. and Fisher R. (1992).



These figures show that 30.8 percent of the liveweight of an average EU pig (liveweight of 107kg) does not finish as standard meat cuts, but ends up as by-products.

- **Average Carcass Weight (kg)**

The weight of the pig carcass is defined by the European Union as the body of slaughtered pig, either whole or divided down the mid line, which has been bled and eviscerated, excluding flare fat, kidneys and diaphragm without tongue, bristles, hooves and genital organs.

Throughout the EU the carcass must be weighed within 45 minutes of slaughter and weight of the cold carcass is calculated by application of a conversion coefficient to this weight. If a slaughterhouse is unable to weigh the carcass within 45 minutes of slaughter, the conversion coefficient should be adjusted accordingly.

Pig carcasses are graded at the time of weighing, according to their estimated lean meat content. This is deemed to be the relationship between the total weight of the red striated muscles obtained by total dissection of the carcass and the weight of the carcass. This relationship is measured using statistical techniques based on the physical measurement of one or more parts of the carcass. In Ireland these are backfat and eye muscle depths measured 6cm from the mid line of the back between the 3<sup>rd</sup> and 4<sup>th</sup> last ribs. The prediction equation is based on data from dissection of a sample of pig carcasses (n=120) and is updated by repeat dissection at intervals of 2 - 5 years. A statistical error is allowed for.

**Table 4.4: The EU Pig Carcass Grading Scheme**

Lean meat as a percentage of the carcass weight	Grade
55 or more	E
50 to 54	U
45 to 49	R
40 to 44	O
less than 40	P

*Source:* Meat and Livestock Commission, 1999.

An optional measure is available whereby a member state may introduce a separate grade S for carcasses with 60 percent or more lean meat, if the characteristics of their pig meat production dictate this.

While pig prices are reported to the EU according to the EUROP grading scheme, the lean meat bands are too wide for payment purposes and payment is actually based on lean meat, estimated to the nearest 1% lean meat.

The most important indicator of unit viability is the cost of producing a kilo of pigmeat (Lawlor, 2000). Besides the costs of inputs, a good technical performance is important to maintain the viability of the pig industry. Feed costs per pig are reduced with increased growth rates and improved feed conversion efficiency. Non-feed costs per pig can be reduced by increased number of pigs produced per sow per year.

## **PRODUCTION COSTS**

Boyle *et al* (1992) argued that since raw material costs constitute the vast bulk of the costs of the final or traded (food) products then the cost of production of this raw material will most likely be the major determinant of a country's competitive position in relation to the products actually traded.

Farm production cost is the cost involved in getting the pig to its slaughter weight. For the chosen countries there is a wide variation in liveweight at slaughter. The UK had the lowest liveweight at slaughter (90kg), compared to the Netherlands which had the highest at 112.2kg.

For this study production costs were divided into feed costs, labour costs and other costs.

### **Feed costs**

Feed is the most important factor in the cost of producing a pig. It accounts for up to 70 percent of the total production cost. The total feed cost includes the feed used to get the pig to its slaughter weight and it also includes the amount of sow feed used.

Sow feed is the amount of feed per sow per year, including feed to boars and maiden gilts. The total sow feed usage amounts to about 1.21 tonnes annually, an average of 55kgs per pig based on an average yield of 22 pigs per year (Teagasc, 2000).

Some pig producers use high quality feed, which is usually more expensive per tonne, and aim for good performance with low conversion efficiencies i.e. feed per unit weight gain. Others opt for cheap feed, often using whatever by-products are available, such as skimmed milk, wheat starch etc, and are prepared to accept a poorer conversion efficiency, provided that the cost per unit meat produced is lower.

Feed Conversion Efficiency (FCE) plays an important role in the overall feed cost. It is defined as the number of kilograms of feed required to produce one kilogram of liveweight gain. FCE varies between classes of pig, but the target efficiency standards for weaners (6-30kg liveweight) is 1.8 and for finishers (30kg to slaughter) is 2.8. On a farm basis, feed usage per unit meat sold may be used as a measure of overall farm efficiency.

Creep (fed to suckling pigs) and weaner diets are more expensive per tonne than sow and finisher diets. Finisher feed represents about 55 percent of the feed cost of producing the finished pig; sow feed about 20 percent and creep/weaner feed 20 percent. This highlights the importance of efficiency of feed utilisation from the weaner stage to slaughter.

### **Labour Costs**

Labour costs arise from two sources, firstly hired labour cost per pig is determined by the gross cost of labour (gross pay plus employer's contribution to pay related social insurance) and secondly, a charge for family labour. The charge for family labour varies between countries due to varying levels of family involvement. The different production systems operated within countries, mean that the amount of labour required per pig varies considerably. The introduction of computerised pig production systems has led to a reduction in labour required, but an increase in capital investment and a need for more skilled labour.

## **Other costs**

'Other costs' include costs other than feed and labour incurred by pig producers.

- **Energy**

Heating and ventilation are the main users of energy. There are wide variations between the chosen countries, mainly due to climatic conditions.

The zone of thermoneutrality is the range of environmental temperature over which heat loss or production by the pig is minimal and independent of environmental temperature. The lower end of this zone is termed the Lower Critical Temperature and the upper end the Upper Critical Temperature.

If the temperature falls below the Lower Critical Temperature, then pigs on controlled feed intakes will use feed energy to maintain heat production and so will grow more slowly, thereby occupying buildings for longer. Or in the case of pigs fed *ad libitum* will consume more feed to produce the same growth rate. In either case FCE is poorer.

If the temperature rises to and begins to exceed the Upper Critical Temperature, then pigs will consume less feed and grow more slowly, thereby occupying the building for longer. Pigs are also subject to stress with excessive house temperatures and this will affect FCE. All four consequences will cost the producer money, either by reduced animal performance or by increased labour.

- **Veterinary and Medicine**

Minimal disease units will have significantly lower drug costs than herds coping with disease problems such as Atrophic Rhinitis, Swine Dysentery, Enzootic Pneumonia and Haemophilus Pneumonia. Irrespective of health status, herds will incur substantial costs for vaccines, disinfectants, iron injections, parasite control and other items.

Muirhead (1987) has estimated the effects of various diseases on food conversion efficiency and days taken to reach 90kg liveweight. The adverse effects in terms of

both FCE and growth are greater when a disease is introduced into a herd for the first time. This is illustrated in Table 4.5.

**Table 4.5: The effect of various diseases on food conversion efficiency and days taken to reach 90kg liveweight.**

Disease	Acute		Endemic	
	Reduced FCE	Increased days to 90 kg	Reduced FCE	Increased days to 90 kg
TGE	0.1	4-10	0-0.05	0-3
Epidemic diarrhoea	0.1	4-10	0	?
Aujeszký's disease	0.1 - 0.2	?	0.1-0.2	6 - 14
Enzootic pneumonia	0.2 - 0.4	10-21	0.05-0.3	3 - 21
Haemophilus pneumonia	0.1 - 0.4	7-30	0.1-0.3	4 - 15
Atrophic rhinitis	0.1 - 0.2	4-15	0.1-0.2	4 - 15
Swine dysentery	0.05 - 0.2	15-20	0.05-0.1	4 - 8
Streptococcal meningitis	0.05	1-3	0.05	0
Mange	0.1 - 0.3	7-18	0.05-0.1	3 - 8
Internal parasites	0.1	7-18	0.1	3 - 6

*Source:* Muirhead, 1987. Note:<sup>1</sup> A deterioration in FCE of 0.1 is equivalent to a 3% increase in feed costs.<sup>2</sup> Each extra day taken to grow from birth to slaughter at 90kg liveweight is equivalent to reducing daily liveweight gain by 4g.

- **Repairs and Maintenance**

Pig buildings and equipment are subject to substantial wear and tear. Unless repairs are carried out, herd performance will be affected with consequent financial loss, so provision must be made for the cost of repairs and maintenance.

- **Depreciation**

Depreciation indicates the amount by which buildings and other assets, such as equipment and machinery, have lost their value with ageing. Buildings usually have a useful life of at least 20 years.

- **Interest**

The capital investment required to establish an integrated sow unit varies widely between countries. The total amount of interest paid varies between countries due to different interest rates and the length of the loan period. For this study it is assumed that 50 percent is financed with borrowed money and the other 50 percent with private capital.

- **Miscellaneous**

Among the other essential items of expenditure on any pig unit are insurance, telephone and secretarial costs, water, advisory, artificial insemination, levies and dead animal collection. These costs are small in comparison to the other costs.

- **Transport**

These are the cost involved in transporting the live pig from the farm to the factory. Acquisition costs make up a small percentage (2 to 3%) of the total cost. Acquisition Costs vary mainly due to the distance from the farm to the factory.

- **Manure disposal and environmental compliance costs**

Manure disposal may, in many countries, be covered by its fertiliser value. About 80 per cent of the nitrogen and phosphorous and 90 percent of the potassium on a diet based on cereals and protein concentrates is excreted by pigs and therefore provides a very useful source of nutrients for plant growth. But in some instances, slurry disposal is a substantial cost to the pig producer as EU legislation limiting the disposal of pig slurry has increased costs, particularly in regions where large numbers of people and pigs are concentrated on a small area of land.

In Ireland, for example, compliance with the terms of integrated pollution control licence (IPC) requires an initial application fee of up to £7500 and an annual charge imposed by the EPA of £1800. Additional costs for licensing units include soil and water monitoring and on-going recording and reporting such as the provision of nutrient management plans.

Another major cost of compliance is likely to be the cost of manure storage. One of the conditions to apply to an IPC licence is the provision of adequate manure storage facilities. Units are required to have at least 6 months manure storage facilities. For many farmers this means significant capital investment to enlarge or replace existing facilities.

- **Animal welfare**

The Council Directive (91/630/EEC) lays down minimum standards for the protection of pigs confined for rearing or fattening. This results in increased costs to the producers.

In Ireland, it has been estimated that 50 percent of dry sows are still housed using tethers (Martin, 2000). Considerable capital expenditure is required to convert the existing facilities to stall system, especially if the adoption of loose housing for sows becomes widespread. In some countries, such as the UK, the provision of straw is mandatory and this represents an additional cost.

## **TOTAL COSTS**

### **Total Cost Per Pig**

The cost per pig calculated is not used for comparison between countries as figures can be misleading due to the different average pig weights in the countries under study. Comparison between countries is made on a per kilogram basis (IRp per kg d.c.w, Irish pence per kilogram dressed carcass weight equivalent).

### **Total Cost Per Kilogram**

This is calculated by taking the total cost per pig and converting it to cost per kilogram by dividing by the average carcass weight. This then allows comparison between countries as it eliminates the differences in pig weights.

### **Currency Conversion**

For ease of comprehension the data for each country is initially expressed in its national currency and then the data is converted to Irish currency. The final stage in

the model is to convert from Irish currency to euro. Annual average conversion rates for the Irish pound were obtained from the Central Bank of Ireland.

### **LIMITATIONS OF THE COST COMPARISON MODEL**

The cost comparison model employed in this study used the costs of production of a kg of pigmeat at the farm gate. Processing and distribution costs were ignored.

Pig carcasses are graded according to their estimated lean meat content as a percentage of carcass weight. This is the relationship between the total weight of the red striated muscles, obtained by total dissection of the carcass and the weight of the carcass. The main aims of carcass classification and grading are to facilitate trade on a quality basis and to improve the matching of production to consumer needs.

While there will continue to be a variation in demand between consumers in Ireland and in other countries regarding the lean to fat ratio desired in pigmeat, there is a growing tendency for the consumer to demand less and less fat in meat. Table 4.6 shows the average lean meat percentage.

**Table 4.6: Distribution of carcasses by country and lean meat percentage 1999.**

	<b>S</b>	<b>E</b>	<b>U</b>	<b>R</b>	<b>O</b>	<b>P</b>
<b>Meat Percentage</b>	<b>60+</b>	<b>59-55</b>	<b>54-50</b>	<b>49-45</b>	<b>44-40</b>	<b>39-37</b>
Ireland	4.37	54.25	38.06	3.32	0.00	0.00
UK	27.8	59.4	11.4	1.1	0.16	0.14
Denmark	53.3	42.2	4.3	0.2	0.00	0.00
Netherlands	9.25	62.26	26.63	1.87	0.06	0.00

*Source:* Ireland: Teagasc, average from the 6 main abattoirs; UK: MLC, Pig Yearbook 2000; Denmark: Danske Slagterier, 2001; The Netherlands: Livestock, Meat and Eggs in the Netherlands, 2000.

Table 4.6 highlights the large variation in lean meat percentage of carcasses between countries. Denmark produces lean pigs, with more than 95 percent of pigs having a lean meat percentage greater than 55 percent. The United Kingdom also has high lean meat percentages, with around 87 percent of pigs having a lean meat percentage



greater than 55 percent. Within European countries most pigs had a lean meat percentage of between 55 and 60 percent, or in the 'E' bracket, in the EU Pig Carcass Grading Scheme.

The cost comparison model does not take account of the different lean meat percentages between countries. The model makes the assumption that a pig carcass is a commodity product. This is not the case, where there are large differences in lean meat percentages between countries.

## **CHAPTER FIVE**

### **Production Costs for the year 1999**

#### **INTRODUCTION**

As far as possible the data were brought to common standards of definition and method of composition. The data were then applied to the cost comparison model described in Chapter 4.

The cost comparison model was developed using an Excel Spreadsheet. The primary data for each country was entered into the spreadsheet in the national currency. An exchange rate from the Central Bank of Ireland was applied to convert the costs to Irish pounds and then to convert from Irish currency into euro. One could argue that the market rate of exchange is inappropriate and that purchasing power parities should be used. However, as the study is assessing the cost of an internationally traded item, the market rate of exchange was used.

Due to differences in slaughter weights between countries, costs are divided by the average carcass weight and comparison is made on a per kilogram carcass weight basis. A full breakdown of the production costs for each of the countries studied are shown in Appendix A.

#### **COMPARISON OF RESULTS**

Costs for each country are expressed in Irish pence per kilogram carcass weight (IRp per kg d.c.w) and in euro. Costs are shown as an average for each country.

#### **FARM PRODUCTION COST COMPARISON**

The production cost of each country is broken down but comparison is made between countries on a feed cost and non-feed costs basis. This is due to the problem of

definitions between countries. Non-feed costs include costs such as labour, energy and veterinary and medicine.

### **Feed cost comparison**

**Table 5.1 Comparison of feed costs between countries.**

	Ireland	UK	Denmark	Netherlands
IRp/kg carcass wt.	57.6	67.0	49.2	50.2
euro/kg carcass wt.	0.73	0.85	0.62	0.64

Table 5.1 shows a large variation in feed cost. The lowest costs were in Denmark and the Netherlands. The highest feed was in the UK, an extra 17.8 IRp per kg d.c.w compared to Denmark.

Of the countries studied, Ireland had one of the most expensive feed costs and Denmark had the lowest. The Netherlands had the second lowest feed cost of the EU countries, since most imported feed ingredients into Europe comes in through Rotterdam and is then trans-shipped to other EU countries. This allows the Netherlands to have lower feed costs than other EU countries.

### **Comparison of non-feed costs**

**Table 5.2 Comparison of non-feed costs between countries.**

	Ireland	UK	Denmark	Netherlands
IRp/kg carcass wt.	33	45.19	50.7	50.3
euro/kg carcass wt.	0.42	57.38	0.64	0.64

The large variation in non-feed costs is shown in table 5.2. The lowest non-feed costs occurred in Ireland at 33 IRp per kg d.c.w. Denmark and the Netherlands share the most expensive at around 50 IRp per kg d.c.w., the most expensive being 50.3 IRp per kg d.c.w.

Of the countries studied Ireland had the lowest non-feed costs. This was due to cheaper labour costs for example in 1999 a farm labourer in Ireland was paid an average of IR£6.50 an hour compared to Denmark at IR£14.38. Environmental costs were lower in Ireland compared to other EU countries. Environmental costs in the Netherlands in 1999 averaged about IR£10 per pig. This was mainly due to a manure disposal levy.

### **Total farm production cost comparison**

**Table 5.3 Comparison of total farm production costs across countries.**

	Ireland	UK	Denmark	Netherlands
IRp/kg carcass wt.	90.6	112.20	99.59	100.05
euro/kg carcass wt.	1.15	1.42	1.26	1.27

Total farm production costs is the sum of feed costs and non-feed costs. Ireland had the lowest production costs at 91 IRp per kg d.c.w.

Total production costs identify the UK as a high cost producer. This is partly due to high feed costs and the exchange rate. The cost of conversion from stalls and tethers to free movement systems, which become compulsory in 1999, and the BSE crisis has also imposed new costs to pig producers (the rendering charge for offal at the slaughterhouse averaged £1.10 per pig produced).

Costs of production are extremely useful and perhaps a country's leading indicator of competitiveness (Ahearn *et al*, 1990). Production costs are the main costs involved in the cost comparison model, accounting for between 70 and 80 percent of total costs. Small percentage changes in production costs would need proportionately much larger changes in the other two sectors (acquisition and processing) for similar effects on the overall cost.

Even though Ireland had high feed costs, it also had the lowest production costs of the EU countries studied, due to the fact that it has the lowest non-feed costs. However,

this is expected to change since significant capital investment is required to comply with the EU Directive concerning pig welfare, and to implement the IPPC licence requirements.

## CHAPTER SIX

### Cost comparisons for the years 1995 and 1999

#### Production Costs for the year 1995 and 1999

Geary (1997) compared pig production costs between different European countries in 1995. This chapter compares 1995 and 1999 costs for Ireland, Denmark, the Netherlands and the UK.

As far as possible, the data was brought to a common standard and the same model described in Chapter 4 was applied for both years. The costs were divided into feed cost, labour and non-feed costs. However, housing costs (repairs and maintenance, depreciation and interest) were not estimated in the 1995 model used by Geary and so they are excluded from the comparison.

Table 6.1 shows the percentage change in feed costs in 1999 relative to 1995. Ireland, Denmark and the Netherlands decreased their feed costs by a relatively similar percentage. This was expected after the 1992 CAP reform.

**Table 6.1: Feed cost comparison, 1995-1999. IRp/kg carcass wt.**

	<b>1995</b>	<b>1999</b>	<b>% change</b>
Ireland	69.4	57.6	-17.0%
U.K.	63.4	67.0	+5.7%
Denmark	59.0	49.2	-16.6%
Netherlands	62.8	50.2	-20.1%

Of the countries studied, the UK was the only one where feed costs increased. This cost increase was due mainly to the change in the exchange rate between the Irish pound and sterling.

Labour costs have increased in all the countries studied (see Table 6.2). The different production systems operated within countries means that the amount of labour required per pig varies considerably. An important part of the introduction of animal welfare regulations is the need for more skilled labour and more inspections during the day.

**Table 6.2: Labour cost comparison, 1995-1999. IRp/kg carcass wt.**

	<b>1995</b>	<b>1999</b>	<b>% change</b>
Ireland	7.3	8.6	+17.8%
U.K.	16.9	18.31	+8.3%
Denmark	12.8	13.97	+9.1%
Netherlands	10.8	11.6	+7.4%

Other costs include costs other than feed and labour. All the countries studied have increased their “other costs” except from the UK. The major increase was in the Netherlands followed by Ireland, mainly due to high environmental compliance costs (see Table 6.3).

**Table 6.3: Other costs comparison, 1995-1999. IRp/kg carcass wt.**

	<b>1995</b>	<b>1999</b>	<b>% change</b>
Ireland	13.4	15.8	+17.9%
U.K.	19.1	18.6	-2.6%
Denmark	25.3	27.0	+6.5%
Netherlands	38.1	49.3	+29.5%

Table 6.4 shows the total production cost comparison for the years 1995 and 1999. Ireland, Denmark and the Netherlands reduced their overall costs, mainly due to the reduction in feed costs. The UK was the only country that showed an increase in total

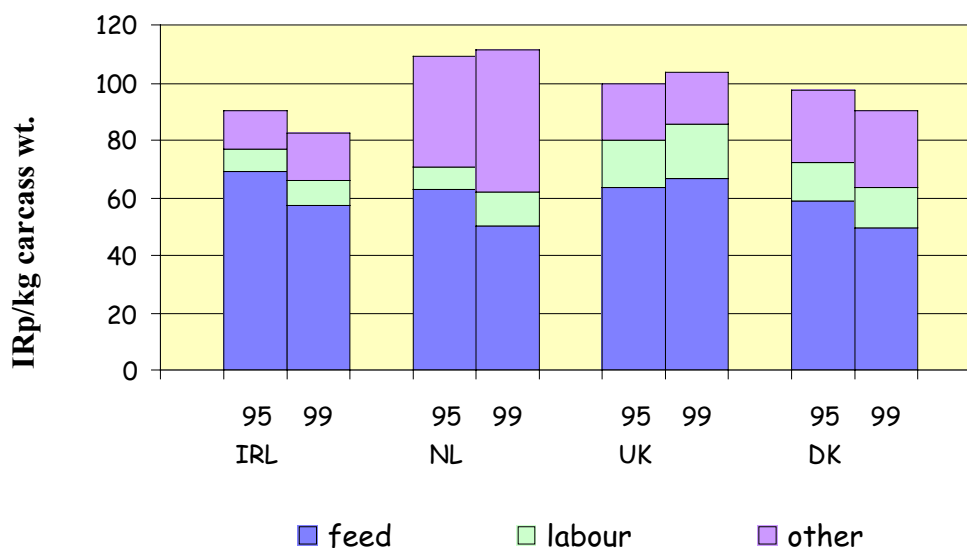
production costs. The strength of the sterling relative to the Irish punt has been an important factor reducing the competitiveness of the British pig industry, or looked at another way, increasing the competitiveness of Irish pigmeat on the UK market..

**Table 6.4: Total costs comparison, 1995-1999. IRp/kg carcass wt.**

	1995	1999	% change
Ireland	90.0	82.0	-8.8%
U.K.	99.5	103.94	+14.4%
Denmark	97.1	90.14	-7.2%
Netherlands	111.7	111.2	-0.4%

Figure 6.1 shows the production costs for Ireland, Netherlands, UK and Denmark during 1995 and 1999.

**Figure 6.1: Production costs comparison, 1995-1999. IRp/kg carcass wt.**



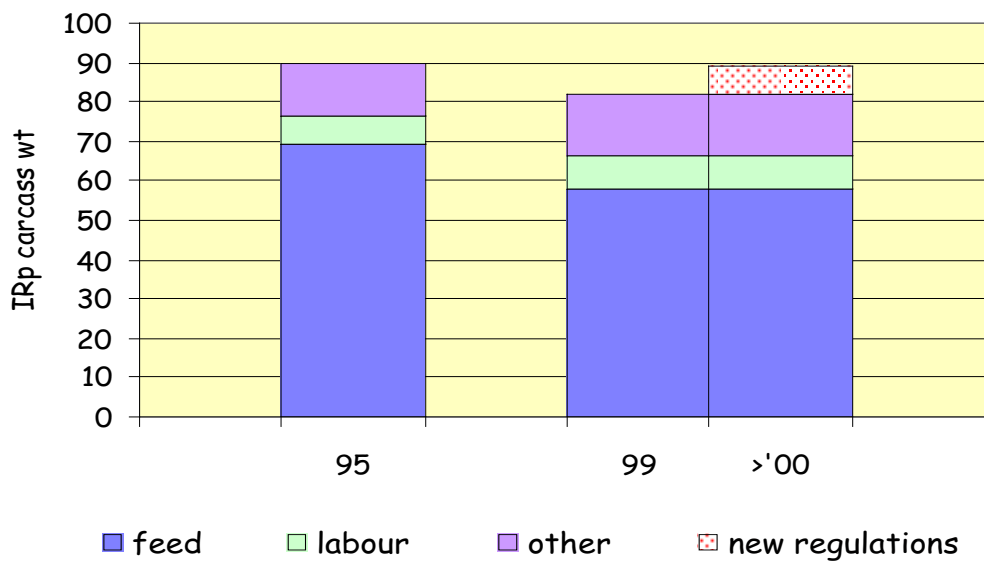
Ireland had the lowest production costs of the four countries studied. However, compliance with environmental and animal welfare regulations will require investments that will increase the costs under the 'other costs' item.



It is expected that the costs of compliance with the IPPC Directive will be approximately 1.5p per kg deadweight. The costs of extra manure storage capacity – another condition to apply to an IPPC licence - has been calculated at around 2p per kg deadweight. Animal welfare provisions under Council Directive 91/630/EEC<sup>1</sup> requires significant capital expenditure to up-grade housing facilities and especially if loose housing is to become the norm (Martin, 2000).

Figure 6.2 shows the expected increase in total costs after the introduction of animal welfare and environmental compliance costs. The reduction in overall costs in 1999 compared to 1995, due to lower feed costs, is lost after the introduction of this new compliance cost.

**Figure 6.2: Irish production costs comparison, 1995, 1999 and expected costs of regulations. IRp/kg carcass wt.**



<sup>1</sup> There is a proposal for a Council Directive amending Directive 91/630/EEC, which will impose more stringent requirements to pig producers.

## CHAPTER SEVEN

### Conclusions

The cost of production forms the basis for the comparisons of competitiveness used in this study. In all the countries studied there is legislation requiring pig farms to comply with environmental regulations. These compliance costs can vary between countries. Producers in some countries are already bearing these costs whilst in others the process is still under way. In future, if other things remain equal, those countries with more 'catching up' to do will be at a relative cost disadvantage to those that have already introduced the changes.

A major part of the study is a comparison of the cost of production on a per kg of carcass weight. Although this can be justified for the reasons cited above, it is still subject to some *caveats* due to data imperfections and the less than homogeneous nature of the product. This is largely due to the different sizes and types of finished pigs produced in the different countries. Inter-country cost comparisons were made only on the basis of feed costs, non-feed costs and 'other' costs. The 'other costs' were sub-divided into: energy; veterinary and medicine; repairs and maintenance; depreciation; interest; miscellaneous; transport (from farm to factory); environmental and animal welfare costs. These 'other costs' were not compared between countries due to definitional differences of the component elements.

Comparison of feed costs showed that Ireland had one of the most expensive feed costs and Denmark had the lowest. The lowest non-feed costs were in Ireland and the highest were in Denmark. This is expected to change since investment is required to comply with animal welfare and environmental regulations.

Comparison of the changes in production costs between 1995 and 1999 showed that when measured in Irish pounds, the UK was the only country where feed costs increased between these dates. This was mainly due to a strengthening of sterling relative to the Irish pound. Labour costs increased in all the countries with the largest increases in the Netherlands.

Comparison of total production costs between 1995 and 1999 showed that Ireland had the lowest production cost per kg of the four countries studied in both years. However, compliance with environmental and animal welfare regulations will require investment that will increase costs under the 'other costs' heading. It is expected that the cost of compliance with the Integrated Pollution Prevention and Control (IPPC) Directive (96/61/EC) will be approximately 3.5IRp per kg dcw. Animal welfare provisions under Directive 91/630/EEC will also require significant capital expenditure. The reduction in overall production costs in Ireland in 1999 compared to 1995 which was due to reduced feed costs following CAP reform is lost after the introduction of new compliance costs.



## APPENDIX A

**Table A.1: Irish breakdown of total costs for the year 1999**

### IRELAND

Exchange Rate £1.00 Ire = 1.27 Euro

### AVERAGE PIG

Average liveweight of pig 91  
(kg)  
Kill out percentage 75.5  
Average carcass weight 68.4  
(kg)

	Cost per pig liveweight	Cost per Kg carcass wgt IRp	Cost per Kg carcass wgt Euro	Total Cost %
<b>PRODUCTION COSTS</b>				
Feed Costs	39.40	57.6	0.731	63.5
Labour and management	5.88	8.6	0.109	9.5
Vet & Med.	1.85	2.7	0.034	3.0
Energy	1.57	2.3	0.029	2.5
Repairs and Maintenance	1.16	1.7	0.022	1.9
Interest	2.67	3.9	0.049	4.3
Depreciation	4.45	6.5	0.082	7.2
Stock depreciation	1.37	2.0	0.025	2.2
Miscellaneous	3.01	4.4	0.056	4.9
Transport	0.68	1.0	0.013	1.1
<b>TOTAL</b>	<b>62.04</b>	<b>90.70</b>	<b>1.151</b>	<b>100.0</b>

Source: Teagasc, 1999.

**Table A.2: UK breakdown of total costs for the year 1999**

**UNITED KINGDOM**

Exchange Rate £1.00 stg = 1.31 Ire

Exchange Rate £1.00 Ire = 1.27 Euro

**AVERAGE PIG**

Average liveweight of 90

pig (kg)

kill out percentage 77

Average carcass weight 69.4  
(kg)

	<b>Cost per pig liveweight Sterling</b>	<b>Cost per pig liveweight IR£</b>	<b>Cost per Kg carcass wgt IRp</b>	<b>Cost per Kg carcass wgt Euro</b>	<b>Total Cost %</b>
<b>PRODUCTION COSTS</b>					
Feed Costs	35.50	46.51	67.01	0.85	59.9
Labour & management	14.10	18.47	18.3	0.33	16.4
Vet & Med.	1.93	2.53	3.64	0.05	3.3
Energy	1.38	1.80	2.60	0.03	2.3
Repairs and maintenance	0.90	1.18	1.70	0.02	1.5
Interest	2.54	3.33	4.80	0.06	4.3
Depreciation	3.61	4.73	6.81	0.09	6.1
Stock depreciation	1.11	1.46	2.10	0.03	1.9
Miscellaneous expenses	0.8	1.05	2.42	0.03	2.2
Straw	0.91	1.19	1.72	0.02	1.5
Transport	1.07	0.47	0.68	0.01	0.6
<b>TOTAL</b>	<b>63.84</b>	<b>83.64</b>	<b>111.79</b>	<b>1.51</b>	<b>100</b>

Source: MLC, 2000 (data from 1999)

**Table A.3: Danish Breakdown of Total Costs for the year 1999**

**DENMARK**

Exchange Rate £1.00 Ire = 9.44 Krone

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Exchange Rate £1.00 Ire = 1.27 Euro

**AVERAGE PIG**

Average liveweight of pig (kg) 100

Kill out percentage 76

Average carcass weight (kg) 76

	Cost per pig liveweight DKK	Cost per pig liveweight IR£	Cost per Kg carcass wgt IRp	Cost per Kg carcass wgt Euro	Total Cost %
<b>PRODUCTION COSTS</b>					
Feed Costs	353.40	37.41	49.22	0.62	49.4
Labour and management	100.32	10.62	13.97	0.18	14.0
Vet & Med	34.96	3.70	4.87	0.06	4.9
Energy	16.80	1.78	2.34	0.03	2.3
Repairs and Maintenance	0.30	2.83	3.72	0.05	3.7
Interest	0.74	6.95	9.14	0.12	9.2
Depreciation	0.78	7.36	9.68	0.12	9.7
Stock depreciation	0.19	1.82	2.40	0.03	2.4
Straw	3.80	0.40	0.53	0.01	0.5
Miscellaneous	12.16	1.29	2.87	0.04	2.9
Transport	6.08	0.64	0.85	0.01	0.9
<b>TOTAL</b>	<b>529.53</b>	<b>74.80</b>	<b>99.59</b>	<b>1.26</b>	<b>100</b>

Source: Danske Slagterier, 1999.

**Table A.4: Dutch Breakdown of Total Costs for the year 1999**

Exchange Rate £1.00 Ire = 2.798 Guilder

Exchange Rate £1.00 Ire = 1.27 Euro

**AVERAGE PIG**

Average liveweight of pig (kg) 107.5

Kill out percentage 81.12

Average carcass weight (kg) 87.20

	<b>Cost per pig liveweight</b> Guilder	<b>Cost per pig liveweight</b> IR£	<b>Cost per Kg carcass wgt</b> IRp	<b>Cost per Kg carcass wgt</b> Euro	<b>Total Cost</b> %
<b>PRODUCTION COSTS</b>					
Feed Costs	122.46	43.77	50.19	0.64	49.94
Labour and management	28.30	10.12	11.60	0.15	11.54
Vet & Med.	7.73	2.76	3.17	0.04	3.15
Energy	4.00	1.43	1.64	0.02	1.63
Repairs and maintenance	7.69	2.75	3.15	0.04	3.13
Interest	14.20	5.08	5.82	0.07	5.79
Depreciation	34.06	12.17	13.96	0.18	13.89
Stock Depreciation	4.81	1.72	1.97	0.03	1.96
Miscellaneous	7.64	2.73	3.13	0.04	3.11
Manure costs	11.37	4.06	4.66	0.06	4.64
Transport	2.95	1.06	1.21	0.02	1.20
<b>TOTAL</b>	<b>245.22</b>	<b>87.64</b>	<b>100.50</b>	<b>1.28</b>	<b>100</b>

Source: Research Institute for Pig Husbandry, 2000.



## Appendix B

Summary of the Schedule 3 of the Welfare of Livestock Regulations, UK.

<p><b>a) Stalls and Tethers</b></p> <p>The Schedule <b>banned the installation of new close confinement stalls and tether systems from 1 October 1991</b>. As part of the phasing-out arrangements, systems already in use on that date were allowed to continue in use until <b>1 January 1999 when all such systems were banned</b>. Tethers may not be used after that date for any longer than is necessary for a specific purpose eg for veterinary treatment or feeding. The Regulation prohibits a person from keeping a pig in a pen or stall unless the following requirements are met:</p> <ul style="list-style-type: none"><li>• the pig must be free to turn around without difficulty at all times;</li><li>• the area of the stall or pen is no less than the square of the length of the pig; and</li><li>• none of the sides of the stall or pen has a length which is less than seventy-five per cent of the pig.</li></ul> <p>It should be noted that these provisions must be satisfied for a system to comply with the Regulations.</p>
<p><b>b) Pigs ability to turn around without difficulty</b></p> <p>pigs (any pig, not just sows and gilts but also boars, weaners and rearers and piglets) must be free to turn round without difficulty at all times. The Regulation does not specify how much space a pig needs to be able to turn around without difficulty. This will depend on a number of factors:</p> <ul style="list-style-type: none"><li>• the length of the pig in question;</li><li>• the weight and state of pregnancy of the pig as this may affect its ability to bend;</li><li>• the layout of the pen, including stall length;</li><li>• any other pigs in the pen, and their behaviour.</li></ul> <p>It is accepted that pigs sharing space in the same pen will touch each other while insufficient unobstructed space or high stocking densities mean that pigs are only able to turn round with difficulty.</p> <p>Where space allowances are tight, producers may find that they can only comply with the Regulations by keeping gilts rather than sows and/or by reducing stocking densities. It is not acceptable for the average of the lengths of the pigs in the pen to be used to assess ability to turn round without difficulty. If pigs longer than the average cannot turn round without difficulty an offence will still have been committed.</p> <p>It should be remembered that heavily pregnant sows, or certain stocky breeds, might find it less easy to bend and may require more space to comply with Regulations.</p>
<p><b>c) Minimum pen size</b></p> <p>the internal area of a stall or pen to be no less than the square of the length of the pig, with no side being less than 75% of its length. Thus, for example, a pig 2m long must not be kept in a pen of less than 4m<sup>2</sup>, with no side less than 1.5m<sup>2</sup>.</p> <p>The Regulation specifies minimum pen dimensions but does not state how many pigs may occupy such a pen. It is acceptable for pigs to share provided they are able to turn round without difficulty at all times. In practice, it is unlikely that a pen with a side less than 100% of the length of the pig will be large enough for more than a single pig to turn round without difficulty.</p> <p>When calculating the internal area of a pen, the space occupied by the following should be excluded:</p> <ul style="list-style-type: none"><li>• the free access stall; and</li><li>• the feeding trough, or other intrusions, as this space is not available to the pig</li></ul>

when lying down.
<p><b>d) Farrowing Crates</b>  The provisions phasing out the use of close confinement stalls do not affect the continued use of farrowing crates provided they are only for a limited period and provided that piglets have sufficient space to be able to suckle without difficulty.</p>
<p><b>e) Exemptions for treatment/ feeding</b>  allows the continued use of close confinement stalls or pens in certain specified situations (including feeding) but <u>only</u> for so long as is necessary for the purpose in view. A more limited exemption from the ban on tethers, only for veterinary purposes, is permitted by Paragraph 1 (1) of Part I of Schedule 3. It is unacceptable for producers to keep their pigs in close confinement stalls or in tethers for longer than necessary. This period should normally not exceed 2 – 3 hours and in practice it should be less.  It is unacceptable for producers to resort to close confinement of pigs to overcome management difficulties eg to avoid injury or when a pig is injured. If it is necessary to isolate or pen singly a bully, bullied, injured or sick pig, this must be in a pen which complies with the requirements of Paragraph 2 (1) and (2) of Part I of Schedule 3.</p>
<p><b>f) Free access stalls</b>  Paragraph 2 (5) of Part I of Schedule 3 allows the use of free access stalls provided a pig can enter or leave ‘at will’. A pig should be able to back straight out of a free access stall, to the full length of its body so that its head is clear of the stall. It should be able to exit the free access stall without being routinely impeded by other pigs in the pen.  Where existing stalls have been converted to make them into free access stalls, the following criteria should apply to meet the requirements of the Regulations:  If the free access stall backs onto a solid wall, the space between the back of the stall and the wall should be at least the length of the pig to enable it to back out the full length of the stall before turning its head.  Where free access stalls are back to back with a central pen, the minimum distance between the front of the stalls (excluding the feeding troughs) should be 3 times the length of the pig and the distance in the central pen between the back to back stalls should not be less than the length of the pig. In practice, minimum distances of 3.5 times and 1.5 times the length of the pig may be necessary to enable the pig to turn round in the central pen without difficulty.</p>
<p><b>g) Boar pens</b>  Part II of Schedule 3 requires a boar pen for an adult boar to be minimum of six square metres and that a larger area be provided when pens are used for service.</p>
<p><b>h) Weaners and rearers</b>  Paragraph 2 of Part V of Schedule 3 implements minimum space allowances laid down in EC Directive 91/630. The requirements have applied to all newly built or rebuilt weaner and rearer accommodation from 1 January 1994. All weaner and rearer accommodation is required to comply from 1 January 1998. The requirements relate to unobstructed floor space available to each weaner or rearing pig reared in a group. Accommodation should also satisfy the requirement of Paragraph 14 of Part I of Schedule 3 which requires that pigs must have access at all times to a lying area which is clean, well-drained or well maintained with dry bedding.</p>

Source: MAFF Pig Space Requirements Guidelines

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