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NORTH OF SCOTLAND COLLEGE OF AGRICULTURE

Agricultural Economics Division

School of Agriculture, Aberdeen

EXPORTING SCOTTISH BARLEY IN THE 1980s

GIANNINI FOUNDATION OF
AGRICULTURAL ECONOMICS

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Agricultural Economics Division

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Chris Mackel & Garth Entwistle

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1. INTRODUCTION

1.1 Remit

This study into the exporting of Scottish barley was one of a number of marketing studies carried out by the Economics Division under the sponsorship of the Department of Agriculture and Fisheries for Scotland.

The objectives of the study were as follows:-

- (i) To assess the future availability of Scottish barley for export.⁽¹⁾
- (ii) To examine existing and potential export markets for Scottish barley.
- (iii) To describe existing ports in terms of facilities and size of ships handled.
- (iv) To draw preliminary conclusions as to the probable level of exports, the availability of markets and the adequacy of port facilities to service this export trade.

1.2 Background to the Study

In common with the rest of the United Kingdom, Scotland has experienced during the 1970s both a surge in cereal production and a stagnation or actual fall in most sectors of consumption. This change is true for both wheat and barley, and it means that the UK's level of self-sufficiency in cereals has increased from 65 to 96 per cent during this period. However this statement of increased self sufficiency disguises the fact that most of the imports now consist of grains which can never be grown in the UK - maize, hard wheats and high diastase barley. These grains are imported to meet specific requirements and, because of the high import levies, volumes have been reduced during the 1970s to minimum levels. Conversely there is now an over production⁽²⁾ of barley and feed wheat, currently amounting to over four million tonnes. The continued swing to higher yielding winter varieties and further pressures on demand in the feed sector will only serve to increase this surplus. Given both the lack of adequate long term intervention storage in the UK, and the apparent antipathy towards this policy, exporting this grain will be the major outlet and relief valve.⁽³⁾

-
- (1) Estimates of future export availability are made upon the assumption of continued UK membership of the EEC, and that the policy instruments of the CAP undergo no radical reform in the foreseeable future.
 - (2) Over production is defined as the fact that a substantial quantity of grain is now produced with no other markets than intervention or subsidised exports as an outlet.
 - (3) Subsidised inclusion in feed rations is another alternative but it appears to be regarded with disfavour by some sections of the Commission.

Table 1.1 below summarises the changes in the UK barley balance sheet since 1972/73.

Table 1.1 Changes in the Supply and Usage of UK Barley Since 1972/73
(^{000 tonnes})

| | 1972/73 | 1980/81 ¹ | 1981/82 ² |
|--------------------------|---------|----------------------|----------------------|
| Production | 9,244 | 10,325 | 10,170 |
| Imports | 488 | 170 | 170 |
| Exports | 111 | 2,385 ⁴ | 2,420 ⁴ |
| Opening Stocks | 444 | 660 | 625 |
| Total Supplies | 10,065 | 8,770 | 8,545 |
| Human & Industrial Usage | 1,749 | 1,925 | 1,950 |
| (of which % homegrown) | (92%) | (98%) | (98%) |
| Animal feed | 7,056 | 5,680 | 5,560 ³ |
| (of which % homegrown) | (95%) | (98%) | (97%) |
| Seed | 374 | 380 | 380 |
| Other Use | 119 | 165 | 160 |
| Closing Stocks | 767 | 620 | 495 |
| Total Utilisation | 10,065 | 8,770 | 8,545 |

Source: HGCA.

Note: 1 Provisional figures only.

2 Latest MAFF estimates (January 1982).

3 This revised estimate is probably still too high; it takes account of a 15 per cent drop in barley usage in the last quarter of 1981, but trade sources indicate that this downtrend is accelerating. Usage is unlikely to exceed 5.0 million tonnes.

4 Includes the direct export of intervention stocks.

Whilst production has increased by some 11 per cent since 1972/73, consumption has actually fallen by 13 per cent. As a result imports have been squeezed out (down by 65 per cent) and exports have increased by almost 2.3 million tonnes. It is the 21 per cent drop in the usage of barley in animal feed which has been the single contributor to this growing imbalance in the UK market - a reduction initially induced by the drop in livestock numbers and lower compound production. Increasingly, however, pressure has come from the use of cereal replacers and the estimate for feed usage in 1981/82 may well have to be revised further. Trade sources indicate that it could be as low as five million tonnes. Pressure on feed consumption will continue in the foreseeable future, both from compounders as they seek further economies in order to maintain competitiveness, and from farmers reducing on-farm usage of intervention standard grain in favour of substitutes and compounds.

As Table 1.2 below shows, the development of the Scottish balance sheet mirrors that for the UK.

Table 1.2 Changes in the Scottish Supply and Usage of Barley Since 1972/73
(¹000 tonnes)

| | 1972/73 | 1980/81 | 1981/82 |
|----------------------|---------|--------------------|--------------------------|
| Production | 1,528 | 1,850 ¹ | 2,200 |
| On-farm Retention | 637 | 500 ² | 500 ² |
| Sales Off-farms: | | | |
| Malting & Distilling | 361 | 561 ³ | 700-810 ⁵ |
| Stockfeed | 457 | 350 ¹ | 300 ¹ |
| Seed | 35 | 75 | 75 |
| Other | 10 | 17 | 15 |
| Exports | 28 | 351 ⁴ | 500 ⁶ |
| Total Sales | 891 | 1,354 | 1,590-1,700 ⁷ |

Source: DAFS, Customs & Excise, Authors' Estimates.

Note: 1 Authors' estimate, plus trade sources.

2 A residual figure.

3 DAFS estimate.

4 Customs & Excise, plus College Survey.

5 Authors' estimate based upon assumption of restocking plus a fairly buoyant malt export market and sales to England leading to a substantial recovery from the very depressed levels of 1980/81.

6 As at March 31, 1982, 473,717 tonnes had been exported, with a further 85,997 tonnes still held in intervention stores. 500,000 tonnes therefore seems a reasonable estimate.

7 The parameters of this range are derived from the minimum tonnage of sales off-farms, and an unknown but substantial sale of barley to England to compensate for the poor quality there in 1981/82.

A 44 per cent rise in barley production, linked to a fall in on-farm usage has led to a significant increase in off-farm sales. At first, part of this increase in sales was absorbed by the expansion of the malting uptake, which had doubled by 1979/80. However this expansion is now over and, given the depressed state of the domestic drinks industry, maltsters will have to look increasingly to export markets to maintain current levels of barley usage. With the reduction in feed usage the export market has once again emerged as the necessary outlet for surplus supplies, and there is no indication that these

developments have fully worked themselves out in the balance sheet. Scotland has still to feel the full effects of the swing to winter barley, which will improve the timeliness of harvest, increase yields and, on the basis of present varieties, reduce the availability for malting. These increased supplies of feed barley will be placed on a market which is under considerable pressure from competing products.

Therefore Scotland, as for the whole UK, will have to rely increasingly upon intervention and exports as a way of disposing of the surplus. Also, with only limited storage space available, intervention is simply an additional stage in the growing export trade.

These developments form the background to this study. Trends in both production, consumption and exports will be examined in more detail in Chapter 2, using national data. Estimates of regional developments within Scotland are presented in Chapter 3.

1.3 Unresolved Issues - The Need for Specific Feasibility Studies

Given the time limits set for the study, some areas remain which were not fully explored at this initial stage. One of the more important subjects remaining to be resolved is the question of freight rates. It is extremely difficult to obtain meaningful quotations for ocean freight rates, particularly if it is for a size of vessel on a route not currently sailed. The availability of return cargoes and the use of time charters can make for significant savings in quotations for 'one-off' journeys. As size of vessel and economies in freight rates are key issues in deciding which export markets can be reached, this question has to be answered before final recommendations can be made.

Linked to this issue is the size of port facility which can be justified on the basis of probable throughput. To load the larger ships (in excess of, say, 10,000 tonnes) requires considerable throughput to finance the necessary investment in handling and storage facilities. Also it is only physically feasible at certain port sites, which may not coincide with the main grain surplus areas.

This report provides only a guide to necessary capital expenditure and levels of throughput. To finally reach a decision on these related problems would require an integrated study looking at a specific investment project in a named port. Only by narrowing down the examination in this way can a final, and realistic, assessment be made of grain availability in the catchment area, maximum outloading capacity, level of capital investment required, potential markets and prices, road haulage and freight rates and, above all, long term economic viability given the probable throughput.

To conduct such a complete feasibility study was beyond the remit of this investigation. However the authors hope that the present study will still provide an important contribution to knowledge, and a firm basis from which to assess particular investment projects. The evaluation of freight rates and the possibilities for reducing rates by using return cargoes is continuing.

2 THE EXPORT AVAILABILITY OF SCOTTISH BARLEY

2.1 Introduction

As Table 2.1 shows, whilst exports of Scottish barley have increased significantly since 1973/74 they have also shown marked fluctuations from year to year.

Table 2.1 Exports of Scottish Barley Since 1973/74
(tonnes)

| | 1973/74 | 1974/75 | 1975/76 | 1976/77 | 1977/78 | 1978/79 | 1979/80 | 1980/81 | 1981/82 |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------------------|
| Tonnes Shipped | 58,592 | 170,837 | 428,364 | 81,884 | 402,306 | 108,214 | 144,807 | 351,036 | 500,000 ¹ |
| Year on Year Change (%) | +109 | +192 | +151 | -81 | +391 | -73 | +34 | +142 | +42 |

Source: Customs & Excise and College Surveys.

Note: 1 Estimate.

Annual fluctuations of the order shown in row two must give cause for serious concern to anyone considering sizeable investment in port facilities. The economic viability of such a venture is obviously dependent upon regular throughput, and failure to reach targeted tonnages would seriously disrupt cash flow and increase indebtedness. It is therefore important to evaluate the factors which have caused these fluctuations, and reach estimates of future availability. It is recognised that part of these variations can be attributed to international marketing conditions and the operation of the EEC export programme. This study however, will concentrate upon internal factors.

Also, as Chapter 4 will show, Scotland already has a number of ports with established reputations for a low cost efficient service. These ports would offer formidable competition for any new high capacity grain terminal in a deep water port.

2.2 Production

Area yield and production The area sown to barley has shown a consistent increase through the 1970s, from 286,739 hectares in 1970 to 443,300 hectares in 1981. This expansion has been at the expense of grass, wheat and oats. Whilst there is evidence that the increase in the barley area may now have plateaued, a significant re-distribution of the area between winter and spring barley is underway. Area planted to wheat is also increasing, as Table 2.2 shows, and this may continue at the expense of barley.

Table 2.2 Area Planted to Wheat and Winter Barley in Scotland, 1978-81
(^{'000} hectares)

| | 1978 | 1979 | | 1980 | | 1981 | |
|--------|------|------|---------------------------|------|---------------------------|------|---------------------------|
| | Area | Area | % Change on prev. year | Area | % Change on prev. year | Area | % Change on prev. year |
| Wheat | 23.3 | 25.2 | +8 | 29.3 | +16 | 43.2 | +47 |
| Barley | N/A | 17.5 | N/A | 30.4 | +73 | 51.7 | +70 |

Source: DAFS.

Winter barley in the 1982/83 crop year will probably account for about 12 per cent of the total barley area. This proportion may finally reach in excess of 25 per cent of the total Scottish barley area. In the Grampian Region the swing to winter barley will probably be most pronounced, and some trade sources suggest it may reach as high as 50 per cent of the total barley area.

Table 2.3 shows estimated yields for barley since 1972/73.

Table 2.3 Estimated Yields of Scottish Barley 1972/73 to 1981/82
(tonnes/hectare)

| Average 1972/73 to 1974/75 | 1975/76 | 1976/77 | 1977/78 | 1978/79 | 1979/80 | 1980/81 | 1981/82 |
|-------------------------------|---------|---------|---------|---------|---------|---------|------------------|
| 4.7 | 4.8 | 4.1 | 5.1 | 4.1 | 4.4 | 4.2 | 4.9 ¹ |

Source: DAFS.

Note: 1 Weighted UKASTA estimate for 1981/82 was 5.2 tonnes/hectare.

The considerable variability shown by yields in Scotland may be largely attributed to the timing and weather conditions during harvest. A later harvest almost inevitably leads to weather losses and high moisture content in harvested grain.

Trials conducted by the Scottish Agricultural Colleges⁽¹⁾ in the period 1979 to 1981 suggest an average improvement in yields of 14 per cent from winter barley. With good management this yield improvement over spring barley may exceed 1.25 tonnes per hectare. Possibly more significant in reducing the annual variability of the Scottish average yields is the earlier harvest of winter barley. Regular harvesting in July or August will reduce susceptibility to weather loss, and should ensure lower moistures off the combine. Therefore the increased area of winter barley may have a more than proportional effect in maintaining annual Scottish production at levels in excess of two million tonnes.

Since the early 1970s production has increased from around 1.4 million tonnes to the 1981 record of 2.2 million tonnes (Table 1.2). Production had previously exceeded two million tonnes in 1977, but harvests in 1978, 1979 and 1980 had been seriously affected by weather conditions.

(1) Three Scottish Colleges Variety Trials 1979-81
(Unpublished Results).

Assuming that the total barley area will stabilise at around 445,000 hectares, and that 25 per cent of this area will be devoted to winter barley, regular annual production in excess of two million tonnes looks highly probable. Use of an average annual yield (4.45 tonnes/hectare) for the period 1975-80 suggests a production of almost 2.1 million tonnes. Yields 15 per cent above the average for these six years⁽¹⁾ would give an output in excess of 2.3 million tonnes.

Quality A survey by the Scottish Agricultural Colleges⁽²⁾ indicated that excessive moisture and inadequate bushel weight were the main reasons for failure to reach intervention standards. Obviously in a normal year any farmer aiming for intervention can improve both these conditions by drying and elementary screening to remove awns and short straws. However in an exceptionally bad year like 1980, this would prove prohibitively expensive in many cases. In this situation the feed market or export market are the only alternatives. With the right port facilities lightweight barley can be blended with better quality grain, considerably increasing its value.

In addition to these two quality criteria, Scottish malting barley is also affected by a problem of dormancy. However, this in no way affects the germinative capacity of the grain, and export demand for Scottish malting barley in 1981/82 has been exceptionally strong.

Variations in quality are therefore not considered to have a significant effect on the level of Scottish exports, although they will affect price levels, market channel to port of loading and end use.

2.3 Consumption

Animal Feed There has been an estimated drop of 27 per cent in the use of barley in animal feed since 1973 (Table 1.2). The actual amount of on-farm feeding is very difficult to gauge accurately. It is also very variable between years, depending upon quality and price. In 1980, for example, on-farm use was the option adopted by many farmers because of the low specific weight and depressed market prices. Including sales to other farmers, it is probable that on-farm use of barley has fallen from around 900,000 tonnes in 1973 to 650,000 tonnes in 1981/82 in Scotland.

Whilst quality and market price differences have affected on-farm use from year to year, the underlying downwards trend to these figures has been given by the reduction in livestock numbers since 1973 (Table 2.4).

(1) Not an unreasonable assumption given the exceptionally poor yields in three of the years (1976, 1978, 1980).

(2) The Quality of Scottish Grain in Store after Harvest, 1973-75
 Scottish Agricultural Colleges Technical Note No.26, May 1979.

Table 2.4 Changes in Scottish Livestock Numbers, 1973 to 1980
('000 head)

| | Beef Breeding Herd | Dairy Breeding Herd | Total Cattle | Female Breeding Pigs | Total Pigs |
|--------------------------------------|-----------------------|------------------------|-----------------|-------------------------|---------------|
| 1973 | 584.8 | 357.5 | 2,565.7 | 73.5 | 667.6 |
| 1980 | 524.4 | 353.9 | 2,338.1 | 49.9 | 468.0 |
| Percentage change 1973 to 1980 | -10.3 | -1 | -7 | -32 | -30 |

Source: DAFS

The substantial reductions shown in Table 2.4 have also affected the compounding industry in Scotland. From 769,000 tonnes in 1973, production of concentrated feedingstuffs fell by almost 12 per cent to 677,000 tonnes in 1980. At the same time the rate of barley inclusion fell from 27 to 25 per cent. As a result, in 1980 barley usage by compounders amounted to only 167,200 tonnes, a reduction of 22 per cent since 1973.

In 1981 there was a reduction of 6.8 per cent in compound production, with total production for the year standing at 630,900 tonnes. Even more significantly, there were indications that cereal replacers were beginning to make significant inroads in the latter part of the year. Barley usage in 1981 might well be as low as 140,000 tonnes, and could go much lower in the future. Table 2.5 shows the breakdown of Scottish compound feeds by type of stock.

Table 2.5 Estimated Production of Compounds and Concentrates in Scotland 1981
('000 tonnes)

| | Cattle and Calf Food | Pig Food | Poultry Food | Sheep, Horse and Other | Total Compounds Balancers and Concentrates |
|--------------------------------------|-------------------------|-------------|-----------------|---------------------------|--|
| Tonnes | 414.1 | 48.2 | 128.2 | 40.4 | 630.9 |
| Percentage of Total Production | 66 | 8 | 20 | 6 | 100 |

Source: MAFF.

Discussions with trade sources, both in the UK and Netherlands, suggest that in the course of the next five years:

- (i) Cereals could be dropped from cattle and sheep rations altogether.
- (ii) Cereal inclusion in the pig and poultry rations would have to be maintained at around 25 per cent but there is no technical reason why this has to be barley.⁽¹⁾

Applying these pointers to Table 2.5 it is possible to draw tentative conclusions as to minimum levels of barley inclusion in Scotland:-

| | Percentage Inclusion Rate | Tonnage ('000 Tonnes) |
|--------------------------------|------------------------------|--------------------------|
| Cattle, Calf and Sheep Rations | 0 - 5 | 0 - 22.7 |
| Pig Rations | 15 - 20 | 7.2 - 9.6 |
| Poultry Rations | 5 - 10 | 6.4 - 12.8 |
| Range | | 13.6 - 45.1 |

It is stressed that these figures are meant to indicate possible minimum levels based upon the following assumptions:-

- i) Compound production figures used are those for 1981, which may prove to be lower than the average for the 1980s.
- ii) Compounders will push ahead to minimise cereal inclusion in cattle rations. This process is well advanced already.
- iii) Compounders will push cereal inclusion in pig and poultry rations down to near the technically possible 25 per cent level. This assumes that cereal replacers will continue to be available and that improvements in their distribution helps to reduce prices. Failure to achieve these targets could add 20 thousand tonnes to the figures given above.
- iv) That the price premium for wheat over barley will be smaller in the 1980s because of increased production of wheat and reduced demand from the poultry sector. As a result wheat will replace some barley in pig and layers' rations.
- v) That a manufacturing subsidy for cereals is not introduced.

(1) For a fuller investigation see Animal Feeding and Production: New Technical and Economic Developments, OECD, Paris 1981.

It is also possible that improved distribution of cereal replacers will encourage their use in on-farm mixing, adding further to the pressure on barley feed usage. As a net result of these changes Scottish barley feed usage could fall by a further 200-250,000 tonnes from present levels.

Malting and Distilling Between 1972/73 and 1979/80, uptake by maltsters doubled, from 361,000 tonnes to 738,000 tonnes. This increase reflected both the buoyancy of the drinks sector, increased capacity in Scottish maltings and the growing importance of Golden Promise.

In 1980/81 this upward trend was sharply reversed, with a 24 per cent reduction in uptake to 561,000 tonnes. This reversal may be attributed to:-

- i) Poor quality of much of the Scottish crop.
- ii) Destocking by Scottish maltsters in the face of high interest rates and extremely depressed demand from the drinks sector.

In 1981/82 it is probable that this reduction has been made good, following the excellent crop and strong export demand. Substantial tonnages have also been moved to England to make good shortages there. It is considered unlikely however, given the underlying depression in the drinks sector, that annual consumption will be much in excess of 750,000 tonnes in the early 1980s. Export markets for malt will have to play an important part in sustaining this level.

Intervention Intervention purchase of grain only emerged as a significant factor in the Scottish market in the 1980/81 crop year, when over 100,000 tonnes were bought in. By the end of the 1980/81 crop year only 37,000 tonnes of this grain remained in stock, the rest having been exported directly from intervention. In fact, the intervention mechanisms make it very unlikely that intervention barley will ever be released on to the domestic market.⁽¹⁾ Intervention, therefore, has simply become an additional stage in the export of grain to non-EEC destinations. In the 1981/82 crop year, 142,539 tonnes of intervention storage were available, of which 116,000 tonnes were taken up by 31st December 1981. Since then, stocks have been reduced by 30,000 tonnes of exports, with a further 25,400 tonnes already allocated for shipment.

It must be emphasised that whilst the importance of intervention may well increase in Scotland, since it is likely to offer the best price for good quality feed barley, this will not reduce export volume. Indeed, as presently operated, it will guarantee a substantial annual tonnage for export. However it does divert the flow of exports away from the traditional route through co-operatives and merchants. Instead this barley is bought

⁽¹⁾ Unless a manufacturing subsidy is used or a severe crop failure occurs.

direct from the intervention authorities by tender. The fact that this is a CIF trade, with its attendant complications, tends to preclude most of the country merchants from offering.

This change in trading pattern has significant implications for any company or group considering investing in port facilities for their own sole use. Unless they have sufficient resources to participate in the intervention trade they may see an increasing proportion of the exportable barley locked out of their reach. The implication of this fact must be that port facilities are best provided either as a stevedoring service or by an international shipper.

2.4 Future Export Availability

Forecasting 5 to 8 years ahead for any commodity is extremely difficult, if not dangerous. However it is the type of exercise anyone considering the substantial investments involved in port facilities would have to undertake. Therefore Table 2.6 below presents an estimated balance sheet for 1988, given normal weather conditions.

Table 2.6 Estimated Balance Sheet for Scottish Barley for 1988
('000 tonnes)

| | |
|------------------------|-------|
| Production | 2,350 |
| On-farm Retentions | 400 |
| Sales Off-farm: | |
| Malting and Distilling | 750 |
| Stockfeed | 180 |
| Seed | 75 |
| Other | 15 |
| Exports | 980 |
| Total Sales | 1,970 |

This table is based upon the arguments presented in Sections 2.3 and 2.4 and suggests an exportable surplus (including intervention stocks and malting barley) approaching one million tonnes by the end of the decade.

The estimate which is probably the most prone to variability is that for on-farm retentions. Given the availability of intervention, farmers would be expected to sell as much grain as possible to this outlet, buying back substandard barley, compounds or cereal replacers for home mixing. However, quality problems may limit intervention sales in any one year, encouraging on-farm retention of lightweight barleys. The net effect on the estimate for exports, however, is likely to be small. Particularly if, by 1988, Scotland had a number of operative export facilities capable of blending barleys of different specific weights; thus adding value within Scotland rather than selling at a discount to continental buyers.

3 THE REGIONAL EXPORT AVAILABILITY OF BARLEY

3.1 Introduction

This section will investigate the regional patterns of production and consumption in order to assess export availability. For this purpose census data for barley production and livestock numbers are used, together with estimates of malting uptake. Port figures are available from HM Customs and Excise, but these do not distinguish between malting and feed barley. Also omitted from these figures are shipments to Northern Ireland, but these have virtually ceased in recent years.

3.2 The North of Scotland - The Highland Region

The census data for this region is shown in Table 3.1.

Table 3.1 Grain Production and Livestock Numbers in the Highland Region¹

| | 1973/74 | 1981/82 | % Change 1981/82 on 1973/74 |
|--------------------------------------|---------------------|----------------------|--------------------------------|
| Total Cereal Area (ha) ² | 33,474 | 41,149 | +23 |
| Barley Area | 21,459 | 31,372 | +46 |
| Barley Production (tonnes) | 93,990 ³ | 165,958 ⁴ | +77 |
| Livestock Numbers² | | | |
| Total Cattle | 188,254 | 162,482 ⁵ | -14 |
| Total Sheep | 985,097 | 812,447 | -18 |
| Total Pigs | 30,795 | 11,522 | -63 |

Source: DAFS and Trade.

Note: ¹ This region includes Caithness, Sutherland, Ross and Cromarty, Skye and Lochalsh, Lochaber, Badenoch and Strathspey, Inverness and Nairn. However most of the grain production is concentrated in Caithness, Ross-shire parts of Inverness & Nairn.

² Cereal area and livestock numbers from DAFS census data; cereals from June and livestock data from December.

³ Production figure calculated using 4.38 t/ha, an average of the years 1970 to 1974.

⁴ Production figure calculated using UKASTA survey data and a yield of 5.29 t/ha. Official DAFS estimate suggests 4.27 t/ha, but the resulting production of 134,000 is considered too low by trade sources.

⁵ Data from the 1980 December census.

Table 3.1 shows that between 1973 and 1981 whilst the barley area increased by 46 per cent, cattle numbers fell by 14 per cent, sheep by 18 per cent and pigs by 62 per cent. The resulting increase in available barley was partly absorbed by an expansion in local malting uptake, with exports showing considerable variability.

Trade sources indicate that barley production in 1981 recovered substantially, both in terms of quality and quantity, from the depressed 1980 levels. A total production of around 165,000 tonnes is estimated for 1981, compared with 147,000 tonnes in 1980. There is a degree of controversy over this estimate for 1981,⁽¹⁾ but the broad implication for the region (based upon a three year average) is an annual barley production in excess of 150,000 tonnes. Further improvements in husbandry techniques, and a higher level of winter barley plantings could push production towards an upper limit of 170,000 tonnes.

Production of this order would leave in excess of 70,000 tonnes to be exported. Invergordon and Inverness are the two main ports of the region, with Wick occasionally loading smaller vessels.⁽²⁾ By the end of March 1982 these ports had loaded 37,000 tonnes in the 1981/82 season. However this is not a true reflection of the region's actual exports during the current season. Grain is taken from the area by road for shipment at Peterhead. Also the nearest intervention store is at Turriff. Feed barley sold for intervention in the region must either go to Turriff or to one of the stores in central Scotland. From there it is exported directly through ports like Peterhead or Leith.

3.3 The North East of Scotland - The Grampian Region.

The situation in the Grampian Region is shown by Table 3.2

(1) See Table 3.1, footnote 4.

(2) See Table 4.1 for details.

Table 3.2 Grain Production and Livestock Numbers in the Grampian Region¹

| | 1973/74 | 1981/82 | % Change 1981/82 on 1973/74 |
|-------------------------------------|----------------------|----------------------|--------------------------------|
| Total Cereal Area (ha) ² | 132,200 | 148,594 | +12 |
| Barley Area | 102,290 | 131,562 | +29 |
| Barley Production (tonnes) | 444,968 ³ | 655,178 ⁴ | +47 |
| Livestock Numbers ² | | | |
| Total Cattle | 614,879 | 526,919 ⁵ | -14 |
| Total Sheep | 472,100 | 485,832 | +3 |
| Total Pigs | 333,960 | 235,133 | -30 |

Source: DAFS and Trade.

Note: 1 This region includes Moray, Banff and Buchan, Gordon, Aberdeen, Kincardine and Deeside.

2 Cereal area and livestock numbers from DAFS census data; cereals from June and livestock data from December.

3 Production figure calculated using 4.4 t/ha, an average of the years 1970 to 1974.

4 Production figure calculated using UKASTA estimate of 4.98 t/ha compared with an official estimate of 4.79 t/ha.

5 Data from the 1980 December census.

After a period of rapid expansion in the 1970s, the barley area now appears to have plateaued at around 131,500 hectares, an increase of 29 per cent on 1973. Barley now accounts for 89 per cent of the cereal area, compared with 77 per cent in 1973. Annual production well in excess of 550,000 tonnes is now a regular feature, with 1981's exceptional 655,000 tonnes distinguished by excellent specific weight. It is in this region that winter barley could have its maximum impact, particularly in areas like Gordon, Buchan and Deeside. Some sources suggest that eventually up to 50 per cent of the area could be sown to winter barley. Therefore an annual production in excess of 600,000 tonnes looks secure and, under favourable conditions could rise to 700,000 tonnes, with an average yield of 5.33 t/ha.

Whilst barley production has risen by just short of 50 per cent since 1973, livestock numbers are sharply down. Most significantly for barley consumption, pig numbers are down by almost 100,000 head (33 per cent). Golden Promise has once again had a significant effect in the area, with malting uptake increasing sharply in every year until 1980/81. However production of Golden Promise has probably now peaked in the area, and could decline in the face of the swing to winter varieties. This trend will reduce the availability of barley for malting, except in areas like Moray and Kincardine, and increase the importance of exports as an outlet.

Already the region is a substantial exporter, with 180,000 tonnes shipped through its principal ports in 1980/81. This figure is equivalent to 34 per cent of the region's 1980/81 production. By the end of March the ports of Fraserburgh, Peterhead and Aberdeen have shipped 215,000 tonnes in the 1981/82 season. It seems possible that by the end of the season this total could be approaching 250,000 tonnes. However it must be noted that not all of this grain originated in Grampian. The efficiency and low cost of Peterhead, and the location of an intervention store at Turriff draws grain into the region.

However, even with this caveat, the region does seem likely to have a regular exportable surplus in excess of 200,000 tonnes in the 1980s. If there is a substantial swing to cereal replacers in feeding the 235,000 pigs in the region, then this exportable surplus could be pushed towards 350,000 tonnes.

3.4 Central Scotland - Fife and Tayside Regions

Barley production and livestock numbers in the Central Region are shown in Table 3.3.

Table 3.3 Grain Production and Livestock Numbers in Central Scotland¹

| | 1973/74 | 1981/82 | % Change 1981/82 on 1973/74 |
|--------------------------------------|----------------------|----------------------|--------------------------------|
| Total Cereal Area (ha) ² | 131,603 | 154,932 | +18 |
| Barley Area | 103,938 | 135,573 | +30 |
| Barley Production (tonnes) | 494,744 ³ | 752,430 ⁴ | +52 |
| Livestock Numbers² | | | |
| Total Cattle | 437,546 | 345,243 ⁵ | -21 |
| Total Sheep | 981,317 | 941,552 | -4 |
| Total Pigs | 122,477 | 70,190 | -43 |

Source: DAFS and Trade.

Note: 1 This region includes Angus, Perth, Kinross, Fife and the Central Region.

2 Cereal area and livestock numbers from DAFS census data; cereals from June and livestock data from December.

3 Production figure calculated using 4.8 t/ha, an average of the years 1970 to 1974.

4 Production figure calculated using UKASTA estimate of 5.55 t/ha compared with an official estimate of 5.23 t/ha.

5 Data from the 1980 December census.

As in the previous two regions, barley production increased sharply in the 1980s (+52 per cent) whilst livestock numbers were in decline. This area has always been noted as a traditional malting barley area, capable of producing some of the best Scottish samples. Increased malting capacity in the region plus exports have helped to absorb the increased production. The swing to winter barley may not be so marked in this area because of the attractions of malting barley. Maintenance of the present barley area, and a 25 per cent swing to winter barley, would lift average production to over 700,000 tonnes, with an upper level of around 780,000 tonnes, at an average yield of 5.75 t/ha.

Traditionally, Montrose is the principal port of the region, but Dundee has also emerged as a major export outlet in 1981/82. Perth has also figured prominently in the exports during the current season, as it does in any season when there is a good trade in malting barley. By the end of March 1982 138,000 tonnes had been shipped, compared with 67,000 in the whole of 1980/81.

In fact past years have shown a reasonable degree of correlation between total production, grain quality and levels of exports. For example, 1975/76 was a record year for exports from the region with 156,000 tonnes shipped. Production in the region was 558,000 tonnes and an HGCA quality survey for that year showed an average nitrogen content of 1.63⁽¹⁾. No separate figures were available for Golden Promise. In 1976/77 production fell to 470,000 tonnes and exports to 36,000 tonnes. Mean nitrogen level was recorded as 1.87 and, most significantly, separate recording of Golden Promise showed only 16 per cent of samples below 1.6 per cent nitrogen. In 1977/78 production recovered to 655,000 tonnes and exports to 148,000 tonnes. The mean nitrogen level fell to 1.61, and the percentage of Golden Promise samples below 1.6 increased to 58 per cent. In 1980/81, despite a near record production of 631,000 tonnes, only 67,000 tonnes were exported directly from the region. However, the mean nitrogen level recorded by the HGCA was 1.82, and only 10 per cent of Golden Promise fell below the 1.6 per cent level. The figure of 67,000 tonnes in fact considerably understates the region's exports in the 1980/81 season. Feed barley was sent to intervention stores at Kirkcaldy and Polmont before export through Leith. Further supplies were sent to the store at Locharbriggs in Dumfries-shire, before final shipment through either Leith or Blyth.

Barley production of 700,000 tonnes plus in the 1980s would create an exportable surplus of around 200,000 tonnes on a regular basis. In a year of good malting quality these exports will tend to show up as a direct movement through the region's ports. In a year like 1980/81 the export volume will be disguised by movement across regional boundaries. Obviously the location of additional intervention stores north of the Tay, and/or the development of either Dundee or Montrose as export centres, would have a significant effect on the volume of feed barley shipped direct from the region.

⁽¹⁾All nitrogen levels are taken from the HGCA Annual Survey of grain quality.

3.5 South East Scotland - Lothian and Borders Regions

Table 3.4 presents grain production and livestock numbers for this, the fourth major grain producing region of Scotland.

Table 3.4 Grain Production and Livestock Numbers in South East Scotland¹

| | 1973/74 | 1981/82 | % Change 1981/82 on 1973/74 |
|--------------------------------------|-----------|---------|--------------------------------|
| Total Cereal Area (ha) ² | 94,661 | 108,431 | +15 |
| Barley Area | 70,363 | 88,105 | +25 |
| Barley Production (tonnes) | 321,910 | 488,983 | +52 |
| Livestock Numbers² | | | |
| Total Cattle | 273,402 | 241,043 | -12 |
| Total Sheep | 1,031,735 | 999,261 | -3 |
| Total Pigs | 100,481 | 99,078 | -1 |

Source: DAFS and Trade.

- Note: 1 This region includes the Lothians, Tweeddale, Ettrick, Landerdale, Roxburgh and Berwickshire.
- 2 Cereal area and livestock numbers from DAFS census data; cereals from June and livestock data from December.
- 3 Production figure calculated using 4.6 t/ha, an average of the years 1970 to 1974.
- 4 Production figure calculated using UKASTA estimate of 5.55 t/ha compared with an official estimate of 5.23 t/ha.
- 5 Data from the 1980 December census.

This region has shown the same expansion in barley production as the previous three regions. Area is up by 25 per cent and production by 52 per cent from 1973/74 levels. Unlike the previous regions, livestock numbers have shown much more stability. Although cattle numbers are down 12 per cent and sheep numbers 3 per cent, pigs, (the major consumers of cereals), have remained fairly steady over the period.

As with the central region there is an established reputation for malting quality barley. Malting barley uptake, the maintenance of pig numbers and proximity of the major livestock areas of the south west have acted to restrain exports. The current record of 109,000 tonnes was established in 1975/76. In the next record production year of 1977/78, out of 440,000 tonnes only 69,000 tonnes were exported. In the current year, some 81,500 tonnes had passed through the region's ports by the end of March.

Once again there is the movement of unrecorded, but substantial, amounts of grain to intervention stores, feed compounders in the south west and to maltsters outside the region.

As in the central region, malting barley is likely to retain a considerable attraction for farmers in prime areas like East Lothian. Winter barley will become far more widespread in the Borders. Assuming an overall swing to winter barley of 25 per cent, and the maintenance of the present barley area, an average annual production of over 450,000 tonnes looks secure, with an upper level of around 500,000 tonnes at an average yield of 5.75/ha. Production of this order would leave some 200,000 tonnes of barley for export, with pressure from cereal replacers possibly adding to this figure.

3.6 Summary of the Regions

This examination of the four major grain producing regions has served to emphasise the general Scottish situation described in Chapter Two. In each region barley production has increased by 50 per cent since entry to the EEC, with the Highland Region recording an exceptional 77 per cent increase. At the same time livestock numbers have fallen considerably, with the cutback in pig numbers being particularly severe. Only the South East, with a mere one per cent reduction in pig numbers, has escaped this general fall.

Part of this fall in feed requirements has been compensated for by an increase in uptake by maltsters, and the periodic export of substantial quantities of malting barley. Neither has this expansion been restricted to the traditional malting areas, with Aberdeenshire particularly prominent as a new area. However, given the variability of quality in some areas, and the attractions of higher yields and increased timeliness in harvest, the expansion of the malting barley area may now be at an end. In the traditional malting barley regions it seems unlikely that the winter barley area will exceed 20 to 25 per cent. In areas less favoured for malting barley eg. Aberdeenshire, winter barley could expand to 50 per cent of the barley area.

The net effect of these changes is that the North East has emerged as the main exporting region. In 1981/82 total exports through the Region's ports will probably come close to 250,000 tonnes. For the late 1980s, 350,000 tonnes is a very real possibility if additional production increases combine with a further cutback in feed consumption. In the north, the Highland Region has the potential for exports of around 70,000 tonnes, and both the Central and South East Regions have the capacity for some 200,000 tonnes by 1988.

These regional production estimates are compiled upon the basis of the assumptions set out for yields, winter barley area, malting uptake and feed usage. Factors which must also be borne in mind are a further increase in the wheat area, probably at the expense of barley, and the effects of a significant increase in the area of oil seed rape.

The siting of new intervention stores, and any decisions to develop export facilities in particular ports, will obviously influence internal movements of grain. As a result a region's exports may be boosted by inflows from other areas. These changes, however, will affect regional and not national export availability.

4 SCOTTISH EXPORTING FACILITIES

4.1 Summary of the Scottish Ports

The Scottish ports range in size from the small fishing harbours of the Moray coast that can load vessels of only 500 tonnes dwt⁽¹⁾ to the deep water ports of Leith and the Clyde that can accommodate vessels of up to 35,000 tonnes. However all the ports are currently restricted in the size of vessel they can load, since they rely upon mobile elevators fed directly by lorries at the rate of 120-180 tonnes per hour. Speed of loading, lack of height and a quayside buffer stock limits vessel size to 3,500 tonnes. An elevator able to load vessels of up to 6,000 tonnes has recently been installed at Leith.

Table 4.1 Export Figures for Scottish Ports 1973/74 to 1981/82
(tonnes)

| | 1973/ 74 | 1974/ 75 | 1975/ 76 | 1976/ 77 | 1977/ 78 | 1978/ 79 | 1979/ 80 | 1980/ 81 | 1981/ 82 |
|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------------|
| Wick | - | 1,317 | 3,001 | 1,928 | 6,397 | 1,059 | - | - | 3,738 |
| Invergordon ¹ | 7,806) | 8,147) | 17,582) | 15,975) | 14,334 | 5,804 | 27,889 | 20,076 | 18,124 |
| Inverness |) |) |) |) | 13,907 | 4,281 | 786 | 10,824 | 15,441 |
| Buckie ² | 3,209) | 17,704) | 22,397) | - | 7,397 | 13,924 | 3,822 | 5,481 | 1,301 |
| Macduff |) |) |) | - | - | - | 1,500 | - | 525 |
| Fraserburgh | 6,571 | 28,443 | 50,503 | 2,021 | 52,499 | 26,328 | 8,625 | 48,332 | 34,464 |
| Peterhead | 18,593 | 34,272 | 71,990 | 5,401 | 90,152 | 42,979 | 89,980 | 127,238 | 170,779 |
| Aberdeen | 3,544 | 6,268 | 1,179 | - | - | - | - | - | 9,466 |
| Montrose | 6,265 | 16,426 | 98,511 | 16,264 | 102,009 | 3,182 | 5,283 | 54,488 | 68,010 |
| Dundee | - | - | - | - | - | - | - | 600 | 32,800 |
| Perth | 8,281 | 11,546 | 49,419 | 19,995 | 45,574 | 2,541 | 3,420 | 12,230 | 28,218 |
| Methil | - | - | 1,759 | - | 518 | - | - | - | 1,360 |
| Kirkcaldy | - | - | 1,687 | - | - | - | - | - | 7,805 |
| Leith | - | 483 | 15,232 | 14,064 | 29,754 | 4,138 | - | 46,767 | 57,483 |
| Berwick ³ | - | 45,231 | 94,028 | 3,803 | 39,765 | 3,978 | 3,502 | 25,000 | 24,203 |
| Glasgow | 4,323 | - | 1,076 | 2,433 | - | - | - | - | - |
| | 58,592 | 170,837 | 428,364 | 81,884 | 402,306 | 108,214 | 144,807 | 351,036 | 473,717 ⁴ |

Source: Customs & Excise and Port Authorities.

Note: 1 Invergordon figure includes Inverness, 1973-77.

2 Buckie figure includes Macduff, 1973-77.

3 Exports through Berwick will partly be of English origin.

4 Figures to the end of March 1982 only.

(1) Ship size will be referred to in terms of their cargo carrying capacity or deadweight (dwt).

Table 4.1 shows the exports of barley since 1973/74. This table highlights the almost complete avoidance by the trade of the deep water ports of Glasgow and Aberdeen. These ports are widely recognised as both expensive and inflexible in their work practices. Only Leith has been able to continue to attract a trade in barley in the 1970s.

The ports that handle the majority of the Scottish export trade are - Invergordon, Inverness, Fraserburgh, Peterhead, Montrose, Perth and Berwick. These ports, with the exception of Perth, (handicapped by the navigational constraints of the River Tay) are well thought of by shippers. All have a reputation of being able to load vessels both quickly and cheaply.⁽¹⁾ All of these ports, with the exception of Perth and Berwick, are able to accommodate vessels of up to 2,400 tonnes. Perth and Berwick are restricted to vessels of up to 1,200 tonnes.

Numerous other smaller ports also participate in this trade, notably Thurso, Wick, Buckie, Macduff and Kirkcaldy.. These ports, though unpopular due to their small size and tidal constraints, are able to take advantage of their isolation and load local barley. Buckie is the principal port in this group, and is able to ship barley as a return load in ships bringing in malting barley. Kirkcaldy is now shipping intervention barley.

The location of the Scottish ports is shown in Figure 4.1, along with the size of vessel accommodated and loading capacity. These ports are described in detail in Sections 4.2 to 4.5 under the regional headings used in Chapter 3.

Glasgow, Scotland's principal deep water port, is not located in any of these regions, but is served by a good road system and is included in the Central Region.

4.2

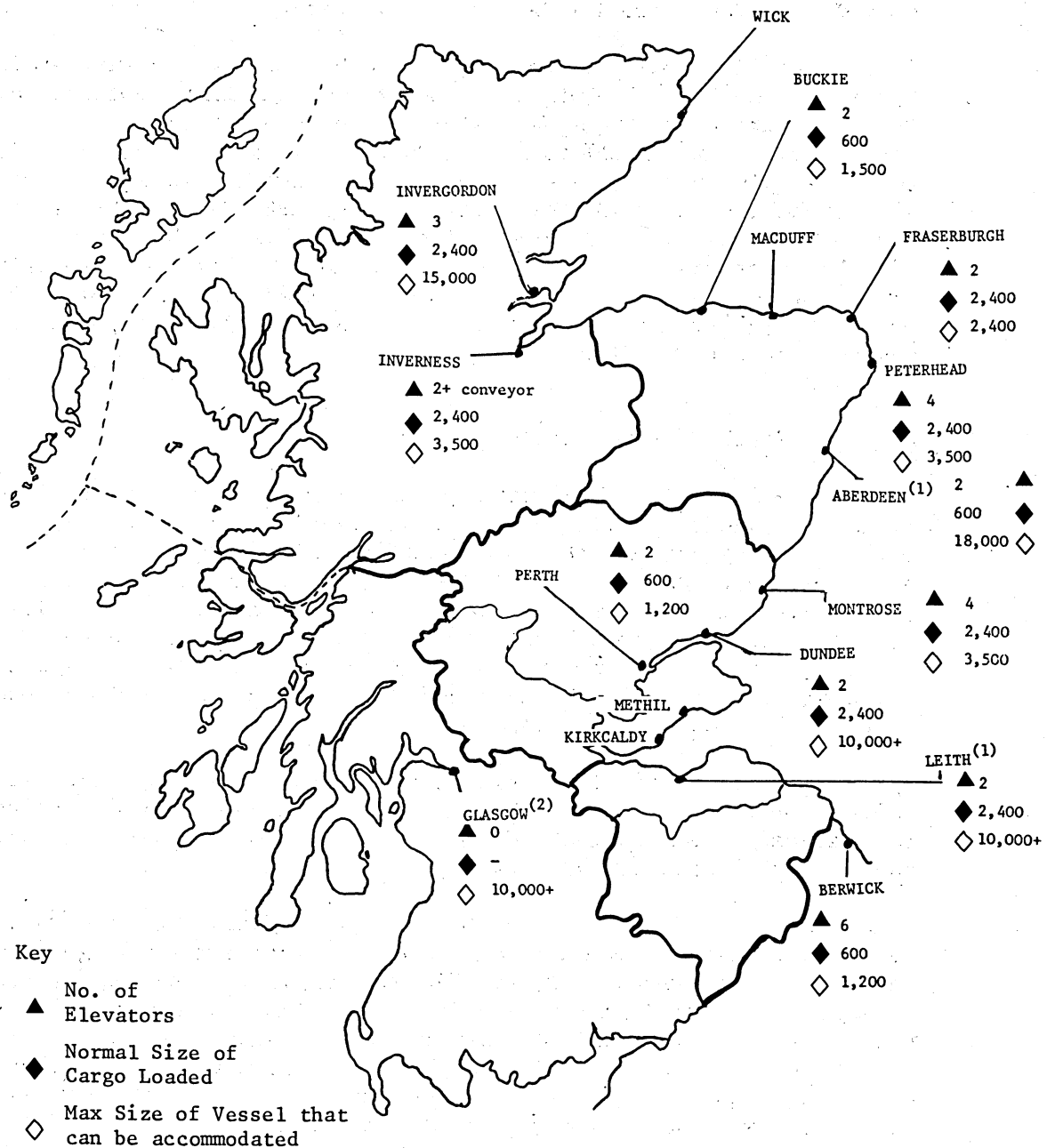
Ports of Northern Scotland

Wick A small port capable of accommodating vessels of up to 82.3 m (270 ft) in length with a draught of 4.88 m (16 ft). Grain is loaded directly from lorries using two portable elevators at a maximum rate of 150 tonnes per hour. Cargoes of 600 tonne are generally loaded within 8 hours. A weighbridge is available within the port.

Invergordon A very sheltered port based upon a Royal Navy jetty managed by the Cromarty Firth Port Authority. The jetty is able to accommodate vessels of up to 15,000 tonnes and is easily accessible by road. Loading is inexpensive and managed by W Lyons of Burghead using up to 3 elevators. Vessels of 3,000 tonnes can be loaded within 48 hours at any of three possible berths. The lack of any dockside facilities, particularly a weighbridge, and the restrictions currently imposed by the Royal Navy on the use of the jetty will however deter any development of the port despite its deep water facility.

(1) Loading costs quoted during the 1981/82 season range from £1.28 p/tonne at Peterhead to £2.16 p/tonne at Montrose.

Figure 4.1 Size and Distribution of Scottish Ports Involved in the Export of Barley



(1) Elevators at Aberdeen and Leith are reported as capable of loading vessels of up to 6,000 tonnes dwt.

(2) Glasgow intend to have an overhead conveyor in operation from the beginning of the 1982/83 season capable of loading vessels of up to 10,000 tonnes dwt at 400 tonnes/hour.

Inverness A small commercial port operated by the harbour trustees and involved mainly in the handling of oil, wood and fertiliser. Vessels of up to 3,500 tonnes with a maximum length of 300 ft (91.44 m) can enter the port. Any increase in the port's ability to handle larger vessels is prevented by the presence of extensive shallow water in the Moray Firth.

Grain is loaded at two locations in the port area. At the Shore Street Quay, McGruther and Marshall Ltd operate two 40 foot elevators. There are two berths at this quay.

Across the River Ness at the Thornbush Quay a new company, Grain Services (Inverness) Ltd, has bought an existing flat store. Currently there is drying and storage for 5,000 tonnes of grain, with loading via an 100 tonne per hour elevator. There is a 50 tonne weighbridge on site. At present lorries have to cross Thornbush Road to reach the quayside. By 1983 it is planned to double the storage available at the site and link the storage to a dockside gantry via an overhead conveyor. A new high capacity drier and intake pits will also be installed. Loading will be raised to 200 tonnes per hour and will be able to continue under adverse weather conditions.

4.3 Ports of North Eastern Scotland

Buckie A small fishing port owned and managed by the Grampian Regional Council. There is a variable level of trade in imported malting barley and exported malt and distillery by-products. The port has two berths which will take vessels of up to 1,500 tonnes with a maximum length of 230 ft (70 m). Sailing is only possible two hours either side of high tide. Ships of 500-600 tonnes dwt normally use the port and can be loaded within 24 hours. Stevedoring services are provided by W.Lyons of Burghead who operate a 30 tonne weighbridge.

Because of the port's limitations it is not normally nominated by shippers and its use is dependent upon incoming vessels looking for cargoes. Development plans currently being considered for the port will not increase its capacity.

Fraserburgh This is an efficient and inexpensive port which compliments rather than competes with the much busier neighbouring port of Peterhead. It is able to accommodate at two berths vessels of up to 2,400 tonnes with a maximum length of 270 ft (82.4 m). A third berth is able to handle vessels of up to 190 ft (58 m). Grain is loaded by Smith and Schultze of Peterhead using two elevators. The departure of ships from the port is restricted to 3 hours either side of high tide.

Peterhead This port regularly ships between 20 and 30 per cent of Scottish barley exports. It is able to accommodate vessels of up to 3,500 tonnes with a maximum length of 295 ft (90 m). These vessels can only leave harbour 2 hours either side of high tide. Usually loading can be completed within 24 hours. Night loading is aided by lighting and up to four elevators are available. Smith and Schultze Ltd are the stevedores and, at £1.28/tonne, the loading costs at this port are amongst the cheapest in Scotland. A 40 tonne weighbridge is available nearby.

To the South of the main harbour is the 'Bay of Refuge' used by ships servicing the oil platforms in the North Sea. Though it can accommodate vessels of well over 10,000 tonnes, there are currently no facilities or quay space available to allow the outloading of grain. Provisional plans are however being considered to build a new jetty, and this would provide both deep water and space for grain silos.

Aberdeen A deep water port capable of accommodating vessels of up to 18,000 tonnes dwt. The Dock Labour Scheme has been adopted and the cost of using the port is relatively high compared with neighbouring non-scheme ports. The acquisition of two elevators in 1981 has enabled grain to be exported through the port for the first time since 1975. There is some grain storage, owned by S.A.I., on the quayside but it requires extensive modernisation. The quay, with a depth of water of 19 ft (5.8 m), can accommodate vessels of up to 6,000 tonnes dwt, but vessel size is limited to 3,000 tonnes by the two available elevators.

4.4 Ports of Central Scotland

Montrose A deep water port capable of accommodating vessels of up to 15,000 tonnes. However vessel size is limited to 3,500 tonnes by the loading capacity of the four elevators operated by NE Transport. Berths for up to six vessels of 2,400 tonnes are available. Within the port area there is 2,000 tonnes of unused grain silo space but no further space for development.

Dundee A deep water port which can accommodate vessels of over 10,000 tonnes at various berths. The recent purchase of two grain elevators, each able to load grain at 120 tonnes per hour, will allow the port to export grain cargoes of up to 3,000 tonnes for the first time. There are two weighbridges within the port and on-floor storage in existing warehouses.

The labour practices in the port are affected by the Dock Labour Scheme and have in the past made the port unattractive to exporters. The port authorities are now, however, willing to negotiate competitive loading rates in a bid to attract new business to the port.

Perth A small port on the River Tay which, because of the tidal nature of the river, is restricted to 20 days loading per month. Maximum size of vessels is 1,200 tonnes, upto a length of 250 ft (76 m). For the more normal 600 tonne ships using the port, it can provide up to 6 berths. Grain is loaded by Calport Ltd using two elevators. Two silos of a total capacity of 900 tonnes stand close to the port but lack facilities to load directly on to a ship. Though Perth is an efficient low cost port its further development is limited by its up-river location.

Kirkcaldy A small port which has adopted the Dock Labour Scheme. Vessels of up to 79.2 m (260 ft) in length with a draft of 4.8 m (16 ft) can be loaded at one berth, where four grain conveyors are available. Three conveyors can each load at 50 tonnes per hour while the fourth is rated at 150 tonnes per hour. Cargoes of 600 tonnes are generally loaded within 12 hours.

Approximately one mile from the dock is a large grain store capable of holding 70,000 tonnes of barley. Adjacent to the dock is a drying facility rated at 50 tonne per hour and operated by Robert Hutchison and Company. The presence of the large grain store in the vicinity of the port has encouraged the export of barley despite the severe limitations on ship size.

Glasgow This, the principal port of Scotland, has not exported any barley since 1976/77. The port's grain handling complex at the Meadowside Granary provides 80,000 tonnes of storage capacity in modern silos, with a further 96,000 tonnes available in various other older silos and sheds. Currently the facility is only equipped to unload vessels, but it is planned to fit an outloading conveyer rated at 400 tonnes per hour. Depth of water at low tide (6.7 m) will limit vessel size to 10,000 tonnes dwt. Vessels will take 2-3 days to load. Grain can be delivered to the store by road or via an adjacent railway siding and taken in at around 100 tonnes per hour.

This investment in outloading equipment is being made in an attempt to attract business through the silos. Its success will depend upon the savings in freight rates for 10,000 tonne vessels being sufficient to compensate for the extra road haulage and competitive stevedoring rates of the smaller east coast ports. Unfortunately at the time of the survey, the Port Authority was unable to quote any freight rates for the type of vessels they hoped to attract to the port.

4.5 Ports of South Eastern Scotland

Leith The largest East Coast port in Scotland and able to accommodate vessels of over 10,000 tonnes. While the two elevators currently employed at the port restrict vessel size to 3,000 tonnes, the acquisition of a third elevator capable of loading 300 tonnes per hour to greater heights is expected to increase capacity to 6,000 tonnes. Two silos are situated within the port but, both the Imperial (55,000 tonnes) and the Edinburgh (16,000 tonnes), are in poor states of repair and incapable of outloading grain.

Though labour arrangements within the port are influenced by the Dock Labour Scheme, the port has been successful during the past two years in regaining a share of the export trade. The port authorities are willing to negotiate competitive rates in a bid to attract more grain exports.

Berwick This port is able to accommodate ships of 1,200 tonnes with a maximum length of 213 ft (65 m). It can provide up to seven berths for the more normal 600 tonne vessels that use the port. The loading of grain is arranged by Lloyds Ltd using up to six elevators, which allows 2-3 vessels to be loaded simultaneously. Sailing is restricted to one hour either side of high tide.

The port takes full advantage of its geographical isolation from larger ports but has little potential for further development.

5 EXPORT MARKETS FOR SCOTTISH BARLEY

5.1 Introduction

The expansion in Scottish barley exports is part of a general growth in the international trade in grains, as shown in Table 5.1.

Table 5.1 World Trade in Grains
(million tonnes)

| | Average 1972/74 | 1977/78 | 1978/79 | 1979/80 | 1980/81 |
|--------------------------------|--------------------|---------|---------|---------|---------|
| World Grain Production | 1,013 | 1,107 | 1,209 | 1,158 | 1,165 |
| World Feed Grain Production | 654 | 716 | 760 | 732 | 706 |
| World Trade in Grain | 129 | 156 | 161 | 186 | 197 |
| World Feed Grain Trade | 65 | 84 | 90 | 102 | 104 |
| World Wheat Trade | 65 | 73 | 77 | 83 | 93 |

Source: Toepfer International/IWC/USDA.

This expansion in grain trade may be largely attributed to the increase in livestock numbers in the Soviet bloc, China, Japan and North Africa. In these countries, plans for increased domestic production of cereals have failed to keep pace with demand, and crop failures have aggravated the situation in certain countries. As a result these countries have been drawn into the international market where their needs have been principally met by North America, Argentina, Australia and, increasingly, the EEC.

In 1981/82 the level of world trade is forecast to reach a record 200 million tonnes.⁽¹⁾ Whether this forecast level will in fact be achieved must now be in doubt. The world recession and serious credit problems in a number of consuming countries are currently depressing demand. These difficulties will certainly have to be overcome before world trade can move significantly ahead from present levels.

The EEC has shared in this growth in the cereals trade, with total exports of 19 million tonnes in 1980/81, double the levels of the early 1970s. In the UK, the growth in exports has been quite spectacular. Total grain exports in 1972/73 amounted to 245,000 tonnes. In the current 1981/82 season it is probable that total exports will exceed 4.5 million tonnes, of which barley will account for 2.5 million tonnes. In 1981/82 Scottish barley exports have been estimated at 500,000 tonnes.

5.2 A Summary of Scottish Export Markets

Scottish barley is exported into three distinct market areas:-

1. Non-EEC countries bordering the Baltic, particularly Poland and East Germany.

⁽¹⁾USDA forecast, 11 December 1981.

2. The major trading ports of Belgium, Holland and Northern France for transshipment to a variety of non-EEC destinations.
3. Various Northern EEC ports for local consumption.

During the 1980/81 season the Baltic states outside the EEC took 60 per cent of Scottish exports and were by far the most important export outlet for Scottish grain. The transshipment trade took a further 30 per cent, whilst the inter-community trade in grain for local consumption accounted for only 10 per cent. While the total quantity exported will vary from year to year the relative importance of these markets to Scotland is considered to have remained fairly constant in the late 1970s.

Scottish exports are restricted from directly entering markets outside these areas because of:-

- i. Scotland's geographical isolation from the important markets of the Mediterranean, relative to competing sources of feedgrain in England and France.
- ii. The inability of Scottish ports to load cargoes greater than 3,500 tonnes.
- iii. The relative scarcity of shipping along Scotland's East Coast and the consequential greater chartering costs when compared with the continental coast.

5.3 An Examination of Existing Export Markets.

1. **Non EEC Countries Bordering the Baltic** Within the Baltic the two principal outlets for Scottish feed barley are Poland and the German Democratic Republic (GDR). The USSR has in the past also presented an important market for Scottish barley, and this trade appears to have been re-established in 1981/82. Sweden, Norway and Finland also import grain from Scotland, though normally in small quantities.

Both Poland and the GDR have been attempting to increase livestock numbers to satisfy an increased internal demand for meat. To support this growth only the GDR has been able to increase its production of feed grains and restrict its dependence upon imports. Poland, handicapped by inefficient management of its agricultural resources, has been unable to support an increase in livestock numbers and, as illustrated by Table 5.2, has been forced to cut numbers as grain production has fallen.⁽¹⁾

⁽¹⁾Also the element of under reporting by Poland's private sector has increased.

Table 5.2 Agricultural Situation in Poland and German Democratic Republic

| | POLAND | | | GERMAN DEMOCRATIC REPUBLIC | | |
|--------------------------------------|----------------------|---------|---------|----------------------------|---------|---------|
| | 1972/74 ¹ | 1978/79 | 1980/81 | 1972/74 ¹ | 1979/80 | 1980/81 |
| Total Grain Production ('000 tonnes) | 21,766 | 17,300 | 19,200 | 8,800 | 9,000 | 9,600 |
| Livestock Numbers ('000 head) | | | | | | |
| Cattle | 12,815 | 12,164 | 11,335 | 5,585 | 5,596 | 5,722 |
| Pigs | 21,709 | 20,983 | 18,563 | 11,518 | 12,132 | 12,871 |
| Total Grain Imports ('000 tonnes) | 3,500 | 6,800 | 8,200 | 3,133 | 3,600 | 3,500 |
| Barley Imports | 1,000 | 1,200 | 2,000 | 370 | 900 | n.a. |

Source: Toepfer International, Agra Europe.

Note: ¹ Annual average for these years.

Despite an improved harvest in 1980/81, Polish grain production failed to reach the 21 million tonnes harvested earlier in the decade. In an effort to prevent a further decline in livestock numbers Polish grain imports were estimated to have risen to 8.2 million tonnes in 1980/81, of which two million tonnes was barley. These imports are spread throughout the year so as to avoid overloading port facilities and to allow credit to be arranged. Imports of feed grain are now totally dependent upon the provision of export credits by exporting countries. Poland's debts, and failure to meet interest payments in 1981, will limit any further advances by commercial banks. The future availability of credits will therefore be almost entirely in the hands of governments, and will be decided by political rather than commercial criteria.

In contrast to Poland, livestock numbers in the GDR have continued to rise while her grain import requirements have held steady at around 3.5 m tonnes, of which around 1.0 million tonnes is now barley. As part of her five-year plan, the GDR expects to restrain imports to these levels. Exporting countries will be expected to arrange credit to cover some part of these imports.

Scotland's inability to load vessels greater than 3,500 tonnes does not put her at a disadvantage in this trade. Vessels of around 2,400 tonnes match up well with the handling facilities at Polish and East German ports. Therefore vessels of 5-6,000 tonnes and above are unable to claim any advantage.

2. **Transshipment Markets** Rotterdam, Antwerp and the surrounding ports represent one of the busiest trading areas in the world. Through these ports pass the greatest proportion of EEC trade in grains and animal feedstuffs. They include Rotterdam, Zeebrugge, Antwerp, Le Havre and Rouen.

The location and infrastructure of these ports is such that grain can be accumulated, stored and, if necessary, blended at a relatively low cost per tonne. These ports have the full range of options open to them for collecting and distributing grain - viz large vessels, coasters, barges, road and rail. For the more distant markets eg. Italy, the Middle East, China and South America, vessels of between 10-80,000 tonnes can be loaded. On these routes vessels currently using Scottish ports would be uneconomic.

Whilst the transshipment demand for grain is entirely dependent upon the granting of export refunds by the EEC Commission, given the Community's growing surplus of cereals, these are expected to continue. The policy is attractive compared to intervention support buying because of its relatively low cost.⁽¹⁾ However there is mounting political pressure against these refunds from the other major grain exporting countries eg. the USA, Canada and Australia which consider that the EEC is using unfair methods to compete in their traditional markets.

3. **Trade with Other EEC Countries** During 1980/81, 10,000 tonnes of Scottish feed barley was sent to EEC destinations for local consumption. Destinations included the North German ports of Oldenburg, Delfziel, Munster, Bremen and Brake, the Dutch port of Zwindrecht, Belfast in Northern Ireland and the Danish ports. West Germany, normally an exporter of barley, imported barley when trade in compound feed with the USSR and Eastern Europe developed. Northern Ireland is regularly short of feed grain for its large pig herd. Denmark, a significant exporter of barley early in the season, tends to run short towards the end of the season.

In these markets barley has to compete with wheat, tapioca and various other cereal substitutes for inclusion in compounds. In the Netherlands, Belgium and North Germany, where the use of cereal replacers has been most pronounced, cattle feed will generally not include cereals. Only pig rations will regularly include substantial quantities of feed grains (25-40 per cent). With the import tariffs on these cereal replacers bound under GATT, their use can be expected to increase and possibly further restrict the trading opportunities within the EEC for Scottish feed barley.

(1) It has been estimated by the HGCA that in the UK the cost of intervention followed by the subsidised export of the grain during the 1980/81 season increased through the season from £47 per tonne to £56 per tonne. In contrast, the direct export of grain required only the granting of an export refund which fell through the season from around £32 per tonne to £24 per tonne. This experience should encourage the European Commission to pursue aggressive export programmes in a bid to avoid the build up of intervention stocks. (HGCA Weekly Digest, Volume 7 (46), 22/6/81).

Whilst Scottish malting barley was not specifically within the remit of this study, substantial exports have been made in a number of recent years. In 1981/82 exports of malting barley have been estimated to be as high as 200,000 tonnes. However this trade is very dependent upon quality, which can vary considerably from year to year. Scotland's main advantage is the predominance of a single variety, the main disadvantage is the problem of dormancy. From conversations with continental maltsters it is probable that they will continue to buy Scottish malting barley on a year to year basis, without wishing to set up long term supply contracts.

5.4 Alternative Markets for Scottish Barley Exports

The destinations for French and UK barley exports are summarised in Table 5.3

Table 5.3 Destination of French and UK Barley Exports
1979/80, 1980/81
('000 Tonnes)

| Destination | 1979/80 | | 1980/81 | |
|------------------------------|---------|---------|---------|-----------------|
| | French | UK | French | UK ¹ |
| France | - | 28.5 | - | 11.2 |
| Belgium | 858.6 | 88.8 | 1,015.6 | 205.9 |
| Holland | 221.2 | 60.6 | 251.2 | 96.4 |
| F.D.R. | 475.7 | 67.8 | 449.3 | 128.2 |
| Italy | 698.0 | 135.3 | 456.3 | 122.1 |
| Eire | - | 10.9 | 14.3 | 6.8 |
| UK | 12.5 | - | 23.8 | - |
| Denmark | 2.2 | 5.2 | 31.7 | 18.7 |
| Greece | - | - | 2.5 | - |
| Total EEC | 2,268.2 | 397.1 | 2,244.9 | 589.3 |
| Poland | 187.5 | 378.5 | 310.4 | 326.6 |
| GDR | | | 59.3 | 142.9 |
| USSR | 126.9 | | 303.5 | |
| Other | 31.7 | | 1.5 | |
| Total Communist Countries | 346.1 | 378.5 | 674.7 | 469.5 |
| Scandinavia | 22.5 | - | 9.3 | 9.9 |
| Alpine | 411.6 | - | 425.6 | - |
| Iberian Peninsula | 172.4 | 243.6 | 79.4 | - |
| Latin America | - | - | 29.0 | - |
| North Africa & Mediterranean | 151.2 | 83.8 | 117.1 | 76.3 |
| Middle East | 389.1 | 3.3 | 881.5 | 17.9 |
| Total | 3,761.1 | 1,106.6 | 4,461.5 | 1,162.9 |

Source: HGCA.

Note: ¹ Figures refer only to the period from August 1, 1980 to February 28, 1981.

Table 5.3 illustrates the importance of Southern European, North African and Middle Eastern countries as markets for French and UK barley. During 1979/80, 42 per cent of UK exports (all of English origin) and 38 per cent of French exports were sent directly to these markets. Four areas are of particular importance:-

- i) **Italy** The consumption of barley within Italy has increased from 1.5 million tonnes in the early 1970s to a level of 2.3 million tonnes in 1980/81.⁽¹⁾ Domestic production, while increasing from 315,000 tonnes in 1970 to 954,000 tonnes in 1981, has failed to meet this demand, and left an annual import requirement ranging from 1.0-1.5 million tonnes.

France is the major source of Italian barley imports, though her share fell from 52 per cent in 1978/79 to 35 per cent in 1980/81. The UK share of this market increased over this period from 7 per cent in 1978/79 to 15 per cent in 1980/81. Imports from countries outside the EEC remain significant, and actually increased from 30 per cent in 1978/79 to 49 per cent in 1980/81.
- ii) **Spain and Portugal** Spain regularly imports 3.0-4.0 million tonnes of maize but has an irregular trade in wheat and barley. During the 1979/80 season over 500,000 tonnes of barley was imported after a poor harvest of 6.25 million tonnes. Of this 236,000 was supplied directly by the UK. During 1980/81 a record crop of 8.6 million tonnes reduced imports to 500,000 tonnes. In Portugal the production of the principal cereal crops, maize and wheat, has declined in recent years. Imports of maize now average 2 million tonnes and, in 1979, wheat imports reached a record 783,000 tonnes. The import of barley and other cereals is on a relatively smaller scale. Barley imports however increased from 34,000 tonnes in 1978 to 60,000 tonnes in 1979.
- iii) **North Africa** Algeria, Libya, Morocco and Tunisia have emerged as important markets for EEC grain exports. Rising incomes and increasing populations have produced a growing demand for cereals. An expansion in domestic wheat production has failed to keep pace with this growth, and imports of wheat into the region have continued in recent years at around 4.0 million tonnes. The production of coarse grain is more in balance with the level of consumption. Table 5.4 shows the barley situation.

(1) HGCA Weekly Digest, Volume 8 (12), 26/10/81.

Table 5.4 Production and Import of Barley in North Africa 1977/79
(^{'000} tonnes)

| | | 1977 | 1978 | 1979 |
|---------|------------|-------|-------|-------|
| Algeria | Production | 741 | 666 | 800 |
| | Imports | 130 | 519 | 230 |
| Libya | Production | 400 | 400 | 450 |
| | Imports | 114 | 41 | 104 |
| Morocco | Production | 2,341 | 2,415 | 2,193 |
| | Imports | 26 | 17 | 13 |
| Tunisia | Production | 376 | 497 | 642 |
| | Imports | 61 | 95 | 38 |
| Total | Production | 3,858 | 3,978 | 4,085 |
| | Imports | 331 | 672 | 385 |

Source: FAO Trade and Production Year Books, 1979.

Imports of barley, as indicated in Table 5.4, averaged only 462,000 tonnes in the period 1977/79. These averages however hide a wide variation in the annual level of imports, due to large fluctuations in yield and levels of production. While the demand for cereals within these countries will continue to expand, the level of imports will remain variable.

- iv) **Middle East** An expansion in the livestock population of Iran, Iraq and Saudi Arabia has led to an increase in the demand for feed grains. The demand for imported grain is however very variable. Imports of barley into the three countries are indicated in Table 5.5.

Table 5.5 Production and Import of Barley in Selected Middle Eastern Countries
(^{'000} tonnes)

| | | 1977 | 1978 | 1979 |
|--------------|------------|-------|-------|-------|
| Iran | Production | 1,230 | 1,000 | 900 |
| | Imports | 333 | 464 | 200 |
| Iraq | Production | 458 | 617 | 872 |
| | Imports | 127 | 163 | 274 |
| Saudi Arabia | Production | 14 | 15 | 16 |
| | Imports | 118 | 533 | 320 |
| Total | Production | 1,702 | 1,632 | 1,788 |
| | Imports | 578 | 1,160 | 794 |

Source: FAO Trade and Production Year Books.

Imports increased from a reported 578,000 tonnes in 1977 to 1.160 million tonnes in 1978, only to fall back to 794,000 tonnes in 1979. Domestic production of barley over this period ranged from 1.63 million tonnes to 1.78 million tonnes.

While the modern ports in the region are able to accommodate large vessels, the demand for much of this grain is in bags. Only a few ports within the EEC, and none in Scotland, are able to prepare such cargoes economically. Also, given the economic and political situation within the Middle East, these markets are likely to remain subject to considerable uncertainty.

Summary Of all these markets, Italy is undoubtedly the most important outlet in the Mediterranean region for both French and UK barley. It is the most consistent and secure of the Mediterranean markets, requiring neither export refunds nor export credits for trade to continue. The use of vessels at around 10-12,000 tonnes would enable Scottish barley to be shipped directly to Italy at a competitive rate, and allow Italy to become an important market for Scottish barley.

6 THE DEVELOPMENT OF SCOTTISH EXPORT FACILITIES

6.1 Introduction

Chapters 2 and 3 examined the availability of Scottish grain on a national and regional basis, whilst Chapters 4 and 5 investigated both existing port facilities and export markets for Scottish barley. It was estimated that Scotland's exports of barley will continue to grow in the next 5 to 10 years, and could reach between 900,000 and one million tonnes by the end of the 1980s. At present, the bulk of Scottish exports goes either to the Baltic or for transshipment through the major continental ports. If Scotland is to enter the more distant markets, like the Mediterranean, then purpose-built dockside facilities will have to be developed. To be successful these facilities will need to be able to:-

- i) Accommodate ships of 10,000 tonnes plus.
- ii) Provide space for silos with direct access to dockside loading equipment of a minimum 400 tonne per hour capacity.
- iii) Attract ships of 10,000 tonnes on a regular basis at attractive freight rates.
- iv) Ensure sufficient throughput of grain to give economic viability.

Some of the factors affecting these criteria will now be examined.

6.2 Deepwater Ports

The Scottish deepwater ports are Invergordon, Peterhead, Aberdeen, Dundee, Leith and Glasgow. At present none of these ports has specialist outloading gear for 10,000 tonne ships, though Glasgow is being developed.

Invergordon's potential is limited because of its northerly location, the naval arrangements, and the lack of space for silo development.

Currently Peterhead is able to take large ships into its outer refuge, but not into its inner harbour. In any event there is no available space for silo development where ships are currently loaded. Plans are being discussed to build a new jetty which would not only accommodate larger vessels, but also create the space for silo development.

Whilst Aberdeen can accommodate the necessary size of vessel, the lack of sufficient quay space next to a 10,000 tonne berth apparently rules out the port.

Dundee can accommodate the necessary size of vessels and has on-floor storage. However a detailed study would be needed to show whether existing storage plus new conveyors, or a completely new storage system, was the best alternative.

Leith can both accommodate the size of vessel required and has existing storage facilities. However these silos were built for taking in imports, and need a complete refit in terms of conveyors, elevators, etc.

It is probable that by 1983 Glasgow will have the ability to load 10,000 tonne vessels out of the Meadowside Granary. However the port is separated from Scotland's main grain growing areas and may have difficulty in attracting 10,000 tonne vessels so far up the west coast.

6.3 Shipping and Freight Rates

The availability of shipping and the quotation of freight rates is both complex and liable to significant change over a short period. As at March 1982 the rate for 10,000 tonne vessels to the Mediterranean (Italy) from continental and English east coast ports was approximately \$13 per tonne. Vessels of 15,000 tonnes did not appear to have any advantage at present, though in the past they had been at a \$5 per tonne discount to the smaller vessels. For a vessel of 3,000 tonnes to the Mediterranean the rate was \$25 per tonne. For the same vessel running to Rotterdam the rate would be \$8 per tonne.

It must be noted that all these rates are for vessels currently sailing from English east coast ports, or their continental equivalent. Rates to Scottish east coast ports could well be \$5 to \$8 higher. Also rates can change within a very short period of time, as well as being affected by type of charter, market conditions and proximity of loading and discharge points to major shipping routes.

Certainly before any major investment project was undertaken these comparative rates would have to be subjected to a systematic and detailed study. As margins in the actual trading of grain are usually small, the successful exploitation of freight rate advantages would be a key to any successful operation.

6.4 Capital Charges and Throughput

After freight rates, another key element in the successful operation of a grain terminal is throughput. The capital investment required is considerable and therefore, unless the capital charge per tonne is to prove excessive, throughput must be maximised. Table 6.1 below gives 'typical' capital sums and the amount required to amortise the debt over 10 years. It is assumed that up to 10,000 tonne vessels will be loaded at a rate of 400 tonnes per hour, with 15,000 tonnes of back-up storage. A grain drier is to be provided on site.

Table 6.1 Annual Capital Charges for a Grain Terminal

| | Range of Capital Investment | | |
|---|-----------------------------|------------|----------------|
| | A | B | C ¹ |
| | £600,000 | £1,000,000 | £2,200,000 |
| Annual Charges for Amortisation of the Debt | | | |
| Rate of Interest: | £ | £ | £ |
| 14% | 115,000 | 192,000 | 422,000 |
| 16% | 124,000 | 207,000 | 455,500 |
| 18% | 133,500 | 222,500 | 489,500 |
| 20% | 143,000 | 238,500 | 525,000 |

Note: 1 Capital estimates are before grant aid and charges assume year end payment.

- Scheme A Assumes substantial storage space is available and requires the minimum installation of conveyors and elevators.
- Scheme B Assumes the need for at least some additional storage plus conveyors and elevators.
- Scheme C Assumes almost a 'greenfield' site requiring all silos and ancillary equipment.

The levels of capital investment shown in Table 6.1 are considered to be conservative, generalised estimates for the types of project outlined in columns A to C. Detailed estimates would have to be prepared for specific projects to take account of such factors as:-

- i. The need for piled foundations.
- ii. Distance from silos to quayside.
- iii. The degree of automation required eg. in-line automatic batch weighers or tipping weighbridges.
- iv. The number of outloading gantries.
- v. The number of intake pits - important if wheat and barley are to be handled.

The amount of silo space provided is also important since it not only affects the speed at which vessels can be loaded, but also gives an important buffer against unexpected delays in the supply of grain to the terminal. If 10,000 tonne vessels were loaded regularly then 15,000 tonnes is regarded as the minimum buffer stock. If it was intended to ship feed and malting barley plus wheat, then the buffer capacity would have to be increased to at least 20,000 tonnes.

In Table 6.2 these annual capital charges are set against various levels of grain throughput to show charges per tonne.

Table 6.2 Capital Charges per Tonne Handled

| <u>SCHEME A: £600,000</u> | | | | |
|---------------------------|--|----------|----------|----------|
| | Rate of Interest and Annual Capital Charge | | | |
| | 14% | 16% | 18% | 20% |
| | £115,000 | £124,000 | £133,500 | £143,000 |
| Throughput (tonnes) | Capital Charge per Tonne (£/t) | | | |
| 50,000 | 2.30 | 2.28 | 2.68 | 2.86 |
| 100,000 | 1.15 | 1.24 | 1.34 | 1.43 |
| 150,000 | 0.77 | 0.83 | 0.89 | 0.95 |
| 200,000 | 0.57 | 0.62 | 0.67 | 0.72 |
| 250,000 | 0.46 | 0.50 | 0.53 | 0.57 |

| <u>SCHEME B: £1,000,000</u> | | | | |
|-----------------------------|--|----------|----------|----------|
| | Rate of Interest and Annual Capital Charge | | | |
| | 14% | 16% | 18% | 20% |
| | £192,000 | £207,000 | £225,000 | £238,500 |
| Throughput (tonnes) | Capital Charge per Tonne (£/t) | | | |
| 50,000 | 3.84 | 4.14 | 4.50 | 4.78 |
| 100,000 | 1.92 | 2.07 | 2.25 | 2.39 |
| 150,000 | 1.28 | 1.38 | 1.50 | 1.59 |
| 200,000 | 0.96 | 1.04 | 1.13 | 1.19 |
| 250,000 | 0.77 | 0.83 | 0.90 | 0.95 |

| <u>SCHEME C: £2,200,000</u> | | | | |
|-----------------------------|--|----------|----------|----------|
| | Rate of Interest and Annual Capital Charge | | | |
| | 14% | 16% | 18% | 20% |
| | £422,000 | £455,000 | £489,500 | £525,000 |
| Throughput (tonnes) | Capital Charge per Tonne (£/t) | | | |
| 50,000 | 8.44 | 9.10 | 9.80 | 10.50 |
| 100,000 | 4.22 | 4.55 | 4.90 | 5.25 |
| 150,000 | 2.81 | 3.03 | 3.26 | 3.50 |
| 200,000 | 2.11 | 2.28 | 2.45 | 2.63 |
| 250,000 | 1.69 | 1.82 | 1.95 | 2.10 |

Source: Table 6.1.

Table 6.2 emphasises the critical importance of throughput, particularly for the higher levels of capital investment. For Scheme C, even at 250,000 tonnes throughput, the minimum capital charge per tonne is £1.69. Table 4.1 showed that in the past only Peterhead has achieved 100,000 tonnes, and no other deep water port has exceeded 50,000 tonnes. In the 1981/82 campaign it is probable that Peterhead will approach 200,000 tonnes.

Therefore on the basis of past performance, and on the projected supplies of 350,000 tonnes for the Grampian Region, only Peterhead appears able to sustain this type of major investment. However the problem with Peterhead is the need for a significant investment in a new quay before a grain terminal could go ahead. This would add greatly to the overall costs, and could not be economically justified on the basis of a grain terminal as sole user.

Both Leith and Dundee have yet to establish themselves as major export outlets, and have never approached the kind of throughput shown as necessary under Schemes B and C to reduce capital charges substantially below £4.00 per tonne. To this capital charge, a minimum operating charge of around £2.00 per tonne would have to be added.

To remain competitive with the smaller ports, it is unlikely that total charges can be allowed to exceed £4.00 per tonne, and guaranteed throughput is obviously critical in achieving this target. Projections in Chapter 3 suggested that both regions could well develop 200,000 tonnes of exportable surplus. However both ports would face considerable problems in attracting a major proportion of this grain. There is a greater number of potentially competitive ports - Montrose, Perth, Berwick and Glasgow. Peterhead's only major 'rival' is Fraserburgh. Also a significant tonnage of grain may be channelled away from the two major ports by the intervention store at Lochabriggs.

On the basis of this preliminary evidence it would seem that Peterhead offers the best site for a major development, but requires a decision on the new quay first. At Leith or Dundee, the necessary throughput is far from assured. Though Schemes A or B are worthy of further detailed investigation, as substantial storage is available at both sites. At this stage no view has been formed as to the suitability or cost of converting this storage.

6.5 Catchment Areas and Road Haulage

Section 6.4 underlined the importance of throughput in ensuring economic viability, whilst Section 6.3 showed the benefits to be gained by loading larger vessels. At early 1982 the saving on sending a 10,000 tonne rather than a 3,000 tonne vessel to the Mediterranean was shown to be £6.74.⁽¹⁾ This saving in freight rates would have to cover the extra capital charges shown in Table 6.2, plus higher stevedoring costs at ports like Leith or Dundee, plus the increased haulage rates for drawing grain in from a wider area.

A summary of road haulage costs for 1981 is presented in Table 6.3.

Table 6.3 Average Road Haulage Costs for Scotland in 1981

| Distance (miles) | Cost/tonne (£) | Average Range (£) |
|------------------|----------------|-------------------|
| 25 miles | 3.37 | ± 0.43 |
| 75 miles | 5.45 | ± 0.86 |
| 125 miles | 6.87 | ± 0.86 |

Source: HGCA.

(1) at £1 = \$1.78.

Given the substantial increases in costs faced by road hauliers during 1980 and 1981, these charges look set to rise by 10 to 15 per cent once the haulage market turns up. With the restrictions on drivers' hours these increases are likely to be more than proportional for the longer distances.

It seems probable, therefore, that a major grain terminal development would have to bear extra haulage charges of at least £2.50 per tonne to pull grain in from the peripheries of its hinterland.⁽¹⁾ As with shipping rates, there is a need for a detailed study based upon a specific location and taking into account the immediate catchment area, road systems and major developments eg. the Kessock Bridge at Inverness. The primary objective would be to assess how much grain could be readily procured within a 30-50 mile radius of the port.

Once again the location of intervention stores is critical, since these stores can pull grain into the immediate catchment area over great distances at a subsidised haulage rate. This grain then tends to be exported via the nearest port. If this grain had been left on the free market it would possibly have proved quite uneconomic to transport it to the port from its original point of origin.

6.6 A Summary of Costs and Benefits.

Tables 6.4 (A and B) summarise the estimated costs of a grain terminal built to handle 10,000 tonne vessels.

Table 6.4A Estimated Total Costs of Grain Terminal Under Scheme B
(£/tonne)

| | Rate of Interest | | | |
|---------------------|----------------------------------|------|------|------|
| | 14 | 16 | 18 | 20 |
| Throughput (tonnes) | Estimated Total Charge per Tonne | | | |
| 50,000 | 6.67 | 6.97 | 7.33 | 7.61 |
| 100,000 | 4.75 | 4.90 | 5.08 | 5.22 |
| 150,000 | 4.11 | 4.21 | 4.33 | 4.42 |
| 200,000 | 2.79 | 3.87 | 3.96 | 3.92 |
| 250,000 | 2.60 | 3.66 | 3.73 | 3.78 |

⁽¹⁾ie. the approximate difference between hauling grain 25 and 125 miles. The terminal at Hull takes grain from as far away as the Scottish Borders and the East Midlands.

Table 6.4B Estimated Total Costs of Grain Terminal Under Scheme C
(£/tonne)

| | Rate of Interest | | | |
|---------------------|----------------------------------|-------|-------|-------|
| | 14 | 16 | 18 | 20 |
| Throughput (tonnes) | Estimated Total Charge per Tonne | | | |
| 50,000 | 11.27 | 11.93 | 12.63 | 13.33 |
| 100,000 | 7.05 | 7.38 | 7.73 | 8.08 |
| 150,000 | 5.64 | 5.86 | 6.09 | 6.33 |
| 200,000 | 4.94 | 5.11 | 5.28 | 5.46 |
| 250,000 | 4.52 | 4.65 | 4.78 | 4.93 |

Note: 1 Although Option A is presented in Tables 6.1 and 6.2 an investment of £1 million is considered to be the probable minimum level for 10,000 tonnes capacity.

2 Total costs are calculated as follows:

| | |
|------------------------|-------------|
| Capital Charge | Table 6.2 |
| Handling Charge | £2.00 |
| Extra Transport Charge | <u>0.83</u> |
| Total Charge/tonne | — |

An extra transport charge of 83p/tonne is calculated on the assumption that 33 per cent of the grain has to be drawn from outside the immediate radius of the port at an average extra cost of £2.50/tonne. This cost is spread over the total throughput. Obviously this estimation procedure tends to overestimate the transport costs of low throughput and underestimate the transport costs of high throughput.

This summary of total costs for Scheme B indicates that an annual throughput of 100,000 tonnes is required to leave a satisfactory margin inside the £6.74/tonne saving on freight rates gained by loading 10,000 tonne vessels. To be competitive with existing ports, loading the traditional Scottish cargoes of 2,000–3,000 tonnes, throughput in excess of 150,000 tonnes would have to be secured.

For Scheme C, an average annual throughput in excess of 150,000 tonnes would have to be assured to maintain a reasonable margin inside £6.74/tonne. For the smaller vessels, even at 250,000 tonnes per annum the facility would be struggling to compete with the low cost ports.

Finally, it is instructive to note that existing or planned export terminals of this type in England have a capital cost in the order of £2.5 million, and a projected or actual throughput of at least 500,000 tonnes per annum.

6.7 Alternative Strategies

The preceding sections have highlighted the costs and benefits of a major grain terminal development. The growing surplus of cereals in Scotland and the attractions of direct shipment to markets like the Mediterranean to secure an outlet, point to the need for this type of major project. However it is unlikely that Scotland can support more than one major east coast terminal. Even one such terminal might struggle to maintain high levels of throughput given:-

- i) High charges per tonne handled.
- ii) Linear distribution of Scottish grain production along the entire east coast.
- iii) Potentially high transport costs.
- iv) Major competition from well established and cheaper ports like Inverness, Peterhead, Montrose, Perth and Berwick.
- v) Glasgow's potentially high but unproved capacity as an export facility, which will be decided by its ability to attract 10,000 tonne vessels at competitive rates.

Therefore, before any major investment programme is initiated, due regard must be paid to the alternative strategy of limited development of existing facilities at a number of east coast locations. The objective would be to facilitate and improve the existing Baltic, North European and transshipment trade with the minimum necessary investment. If vessel size is limited to 4,000 tonnes then maximum use can be made of existing storage, whilst the scale of investment in ancillary equipment would be considerably reduced.

Despite the restriction on the size of vessel, the availability of quayside storage, efficient outloading equipment and ease of cargo inspection would make these facilities very attractive to shippers.

Such a project is underway at Inverness, and the ports of Montrose, Dundee and Leith, in particular, should be re-examined as potential sites. Peterhead is excluded simply because of the present limitations on quayside space.

The basic facilities of such a development are considered to be:-

- i) Controlled intake over a weighbridge.
- ii) A site office performing proper sampling and basic quick tests of all loads in and out, plus administrative and stevedoring services.
- iii) On-site storage of at least 5,000 tonnes.
- iv) Adequate conveyors and elevators to ensure efficient loading of up to 250 tonnes per hour. External conveyors should be enclosed.
- v) Ideally an on-site high capacity drier with back-up holding bins.

The costs of such a scheme would be in the region of £450,000 before grant, depending upon site and existing facilities.

7 SUMMARY AND CONCLUSIONS

7.1 The Problem

In common with the rest of the United Kingdom, Scotland has experienced a substantial increase in the production of barley during the 1970s. From just over 1.5 million tonnes in 1972/73, production increased to 2.2 million tonnes in 1981/82. At first much of this increase was absorbed by an expansion in the malting sector but, increasingly, Scotland has had to rely on intervention and exports as a way of removing surpluses.

The domestic malting market peaked in 1979/80 and is under continuing pressure from a UK drinks industry undergoing a severe recession. In the current year export demand for both malt and malting barley has been very strong. The continued swing to winter cereals in other traditional malting barley areas of Europe should give an underlying strength to export demand in the 1980s.

Feed usage of barley has been under constant pressure in the late 1970s. Livestock numbers are down significantly, and Scottish compounders have seen their production drop by 17 per cent since 1979. Further pressure is now being exerted by the inclusion of cereal substitutes at both compounder and on-farm levels.

The net effect of these changes in production and consumption is an exportable surplus of 500,000 tonnes in 1981/82, with the very real possibility that this figure could almost double by the late 1980s.

The implication of this continuing swing to exports is that there is a need to investigate both the potential export markets and the necessary export facilities to service them. This report provides the foundations for this research.

7.2 The Alternatives

From 59,000 tonnes shipped in 1973/74, Scottish exports have moved upwards somewhat irregularly to an estimated 500,000 tonnes in 1981/82. This increase has been achieved without any significant investment in port facilities. Currently there are no port silos with direct outloading via conveyors, though this is planned at both Glasgow and Inverness. The bulk of the grain is taken from inland stores by lorry for direct loading via open conveyors. As a result the size of vessel is restricted to 3,500 tonnes, and export markets limited to the Baltic, north European and transshipment trade.

A number of alternative strategies are available:-

- 1) **No change** So far the available facilities have coped with Scottish exports quite adequately. In most ports they have provided a flexible, and very cost effective, way of handling grain. Peterhead is an excellent example of this type of operation, but it has been repeated at numerous other east coast ports.

However, the question must be asked as to whether the present system could cope with an additional 400,000 tonnes of grain without serious dislocations occurring. Already sampling and quality control has proved a problem under the immediate post-harvest pressure. Also there are no facilities for blending grains to meet minimum standards. As a result in 1980/81, light specific weight barley had to be sold FOB at a substantial discount for blending elsewhere. Finally, it is uneconomical to send 3,500 tonne ships to Mediterranean destinations.

- ii) **Deepwater Ports** One solution to Scotland's growing export potential is a purpose-built terminal located at one of Scotland's deep water ports. On the east coast these are Invergordon, Peterhead, Aberdeen, Dundee and Leith. Invergordon is considered to be too peripheral to attract the necessary volume of grain. On the basis of both past performance and future potential, Peterhead is the ideal site, but it would require a substantial prior investment in a new quay. Aberdeen does not appear to have the necessary quay space next to an adequate berth. Both Leith and Dundee remain as potential sites. Leith already has substantial silos but needs a complete refit of conveying equipment. Plans to develop the Meadowside Granary in Glasgow are underway and should be completed in 1983. However Glasgow's west coast location may prove a handicap for both road haulage and sea freight rates.

The extended distribution of Scotland's main grain growing regions, and competition from existing ports, probably means that only one major east coast development would be economically viable.

The benefits of a large grain terminal able to handle vessels of 10,000 tonnes are:-

- (i) Ability to reach more distant markets like the Mediterranean.
- (ii) Substantial savings on freight rates per tonne shipped.
- (iii) Increasing volume of business through being able to market a service package to the trade.
- (iv) Ability to control quality and meet contract specifications more exactly.
- (v) Consequent to (iv), the ability to blend grains and add value to light specific weight material.

However, this type of terminal would involve substantial capital costs, estimated in this study at a minimum of £2.2 million. Therefore, throughput becomes a key priority in order to minimise capital charges per tonne. A minimum throughput of 200,000 tonnes would be necessary (Table 6.4), and only Peterhead has an established record of this order. Development of either Leith or Dundee would mean these ports having to attract the bulk of the surplus grain

available in their immediate hinterlands. Whether they would achieve this position, given their higher handling charges and competition from such ports as Berwick, Perth and Montrose, must be seriously questioned. Also, as intervention is a major factor, grain may be drawn away from these regions, eg. to Locharbriggs, and then exported through the nearest port to that store.

Given the high costs of road haulage, the regular movement of grain over long distances, except at rates subsidised by the intervention system, must be considered extremely questionable. For example, if a terminal at Leith had to draw grain regularly from the Grampian Region this would add £6 to £7 per tonne to the costs of moving the grain from within the Region to Peterhead; effectively cancelling out any advantage gained in freight rates for 10,000 tonne over 3,500 tonne vessels. However, it is quite possible that grain from the Grampian Region might be first taken to an intervention store at Kirkcaldy, and then exported through Leith. The implication of this fact is that the location of major intervention stores will have a significant effect in determining throughput at particular ports.

- iii) **Medium-scale Development** It has been established that there is a need to improve Scottish export facilities to cope with the increased tonnages, improve quality control and attempt to secure regular outlets. A large terminal able to condition and hold substantial buffer stocks and load vessels of at least 10,000 tonnes is the ideal solution. The Tradax terminal at Hull and the new Continental terminal under construction at Southampton are excellent examples of this type of project. However a question mark still hangs over whether such a terminal would be viable in Scotland.

An alternative would be the development of medium-scale facilities at a number of east coast locations. Such a project is already going ahead at Inverness. Where possible, maximum use would be made of existing storage, but new conveyors and covered elevators would be necessary to facilitate handling. Access to a weighbridge, and the installation of proper sampling probes would also be necessary. Given Scottish conditions a high capacity drier would also be an important addition to the complex.

Such a development would almost certainly limit vessel size to around 3,500 tonnes. However, on the basis of this preliminary investigation, this disadvantage would be compensated for by the savings in capital charges per tonne and the lower haulage charges gained in only drawing grain from the immediate area of the port. Initial indications are that if capital expenditure can be contained below £500,000, then the project would be viable at levels of 70-100,000 tonnes. This level of throughput is a realistic target for a number of east coast ports. The development of such a facility would certainly attract great interest from shippers. It would also form an important link with the great transshipment ports of Rotterdam, Antwerp and Rouen. Also the increasing volume of trade in cereal

substitutes has created the potential for an important two-way trade. If this could be developed it would increase throughput and lower freight rates.

7.3 Conclusion

This study has provided an important first step in highlighting Scotland's growing exportable surplus of barley. A preliminary investigation of the existing and potential markets has been made, and Scotland's existing export facilities investigated. There is a definite need to develop port facilities to cope with the volume, control the quality, attract business and help to secure outlets. The alternative strategies for this development have been outlined and evaluated. Given the linear distribution of Scotland's major grain producing areas, a number of medium scale developments (utilising existing storage where feasible) seems to offer the best way of minimising both road haulage and capital charges. Certainly Scotland could only support one major east coast terminal, and this would have to compete very strongly against existing ports to attain an economically viable throughput.

The next stage is a more detailed examination of both the Mediterranean and transshipment markets. The transshipment market can be adequately serviced with vessels of up to 3,500 tonnes, whilst the Mediterranean would require a vessel size of at least 10,000 tonnes. Therefore the long term future of these two markets has important implications both for the volume of Scottish exports, and the size of the individual grain terminals needed to service them.

There is also a need for a detailed evaluation of individual projects. This evaluation would have to take account of depth of water at the quay, existing facilities, projected capital costs, size of catchment area and availability of grain, location of nearby intervention stores, and the trade-off between road haulage and freight rates. Finally, the development of a terminal either jointly by a number of trading companies or by a stevedoring service company, may offer the best way under Scottish conditions of ensuring adequate throughput.