FALKLAND ISLANDS

ECONOMIC STUDY 1982

Chairman: The Rt Hon. Lord Shackleton KG PC OBE

Presented to Parliament by the Prime Minister
by Command of Her Majesty
September 1982

LONDON

HER MAJESTY'S STATIONERY OFFICE

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FALKLAND ISLANDS ECONOMIC STUDY 1982

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GLOSSARY

In the text of this study we have frequently used acronyms. Although we have sought to spell these out where they first occur, the following list may help the reader.

BAS	British Antarctic Survey.
DAFS	Department of Agriculture and Fisheries for Scotland.
FIC	Falkland Islands Company.
FIG	Falkland Islands Government.
FIGAS	Falkland Islands Government Air Service.
GTU	Grasslands Trials Unit.
MAFF	Ministry of Agriculture, Fisheries and Food.
MoD	Ministry of Defence.
ODA	Overseas Development Administration.
PWD	Public Works Department.
SOA	Falkland Islands Sheep Owners Association.
YPF	Yacimientos Petroliferos Fiscales (the Argentine state oil company).

SECTION ONE

INTRODUCTION BY LORD SHACKLETON

In late 1975 I was asked by the then Foreign and Commonwealth Secretary to carry out an independent economic survey of the Falkland Islands. With a team of experts recruited by the Economist Intelligence Unit we produced a long study which was published in the summer of 1976.

At the end of May 1982, when troops of the British Task Force had landed on the Falkland Islands and it was clear that the full re-possession of the Islands was only a matter of time, the Prime Minister asked me to update the 1976 Report. I was most fortunate in being able to get together within a matter of days five out of six of my original team, who were all keen to take on the task.

We were given the following terms of reference:

"In the light of:

(a) the changed circumstances of the Falklands arising from the Argentine invasion and occupation, and its military consequences; and

(b) the changed world economic environment since 1976,

to revise as necessary, examining (as in the original study) social as well as economic aspects, the conclusions and recommendations made in the original study; and to report to the Prime Minister as soon as possible.

The revision should encompass South Georgia and the South Sandwich Islands as necessary."

It was clear from the outset that we would labour under certain difficulties. The first limitation was time. Our new report was required as early as possible, and we have produced it in less than two months. Working to this timescale it has been impossible to pay a visit to the Islands themselves. Such a visit would have refreshed our acquaintance with the scene of our study and pointed up any changes which have taken place since 1976. But quite apart from the practical problems of getting there and back, a visit would not have yielded in the immediate aftermath of the fighting scope to gain further statistical information or to form valid conclusions about the attitudes and aspirations of the Islanders. These inevitably will take some time to crystallise. The conclusions of the Report should therefore be read with an awareness of these constraints.

For reasons given above we have imposed on ourselves another limitation concerning the scope of our study. We have not, as in the 1976 Survey, examined aspects of the Islands' education and social services, telephone communications and broadcasting. Moreover, insofar as it is possible to separate an examination of the immediate rehabilitation needs of the Islands from an analysis of future economic development prospects, we have sought to restrict ourselves to the latter. Underlying our work is the assumption that the physical *status quo ante*

will be restored, with houses repaired, water and power supplies made functional again, and mines cleared in due course from the countryside (or "camp") so that their presence no longer constrains sheep farming.* However I must add that we have been glad to respond to invitations extended to us by the Ministry of Defence and the Foreign and Commonwealth Office to provide advice on such matters as the likely social impact of the garrison, and have made suggestions on ways to minimise adverse consequences and take advantage of the potential benefits.

I am also conscious that a third limitation has been imposed by the rapidly changing military and political backdrop to our study. When we began our work in June this year, the fighting on the Islands was at its height, and the action required to retake Port Stanley was a matter of anxious conjecture. Now despite the *de facto* cessation of hostilities the situation is clearly still fluid, with the future attitude of Argentina to co-operation with the Islands unknown but at the very least unpromising. In the introduction to the 1976 Report I emphasised the importance of regional co-operation in any major new developments of the Islands' economy. I believe that that logic still applies. We hope particularly that co-operation will be forthcoming from South American countries in one aspect, external communications, because without satisfactory air links the Islands' prospects will be considerably less promising.

A fourth limitation which has followed from the three I have already discussed has been to restrict the length of our report. The geography, soil fertility and marine biology of the Islands remain as described in our 1976 Survey, and ideally the present study should be read against the background of the two volumes of the 1976 Report. We have therefore only summarised the social and economic structure of the Islands, and for more detailed background to Sections 3, 4 and 6 of this study the reader is advised to turn to Volume 1 of the 1976 Report. As a further aid to brevity we have not commented in full on the implementation since 1976 of recommendations we made then, although references are made in passing in the appropriate sections. We have however reproduced as Appendix Five the Introduction to my 1976 Report.

We have set out at the beginning of this study our present conclusions and recommendations. Some of these repeat or develop those we made earlier. We have sought also to cost our recommendations.

Perhaps it is worth noting that when our 1976 Report was the subject of discussion in Parliament†, it was stated that the major capital projects involved expenditures of some £13-14 million, without indication of the time scale over which this expenditure would fall or that some would be well into the future, if at all.

Our recommendations in the present study involve the expenditure of some £30-35 million over a five-year period (excluding exploratory fishing). Even allowing for the erosion in the value of money since 1976, this represents an

*Clearly some of this work will take considerable time, particularly the last; we understand that mines may be a hazard for several years unless new techniques can be applied to detect those scattered by the Argentines.

†H.C. Report 2 February 1977, Vol. 925, Cols 550-561.

increase. The need to spend this larger sum is caused by the further deterioration of the economy of the Islands, which as we point out in Section 2, is in danger of eventual collapse if urgent action is not carried out.

Hence the radical nature of some of our recommendations, which may be unexpected in their extent, particularly in respect of farm ownership and of institutional change. The former is necessary to stem the drain to the UK of farming profits which might otherwise be reinvested in the Islands. This is necessary to halt the decline in the wool industry which our study has revealed (see Sections 2.2 and 6). I emphasise that in making this recommendation we are bound to acknowledge that the companies who farm the Falklands, most of which are registered in the UK, have had a difficult problem, on account of declining profits, to combine their obligations to the Islanders and their employees with those to their shareholders in the uncertainties of the situation, particularly the long-term threat from Argentina. At the same time we must pay tribute to owners, managers and work-force who have continued to produce wealth in the face of the difficulties, and to sustain a way of life which has many attractions.

The institutional change involves two sets of recommendations. One of these was in the 1976 Report (but, it seems, largely ignored), intended to strengthen the Government structure of the Falkland Islands (Section 2.13). The other is to set up a Falkland Islands Development Agency to act as a vehicle for economic development (Section 2.9).

While naturally our major concern has been the Falkland Islands and their inhabitants, we have sought to draw attention to wider and longer-term issues in the South Atlantic and the Antarctic. It is not possible to provide the same sort of analytical approach to these wider issues and prospects that we have to the Falkland Islands. Nonetheless we are aware that there is great potential wealth in the krill and squid around South Georgia and elsewhere in the area; it is for this reason that in particular we have recommended the establishment of a 200 mile limit around the Dependencies as well as the Falkland Islands. Although the Falklands are now the focus of political attention, South Georgia may in the long run be of greater importance to the future development of the potential wealth of the South West Atlantic and the Antarctic than the Falkland Islands. We also emphasise the importance of the right conservation policies, and of the need for awareness of possible threats to the Antarctic Treaty.*

I am very conscious of the debt of thanks we owe to many for help and advice in preparing this study. We have spoken to as many Islanders past and present in the United Kingdom as we were able. We also held meetings with the Civil Commissioner, members of the Falkland Islands Government, the Councils and the Grasslands Trials Unit. To the Falkland Islands Company, other companies, and the Sheep Owners Association we are most grateful for the provision of information, without which our analysis of the onshore economy would have been impossible. Many UK companies, experts and individuals,

*An example of this is Argentina's action in maintaining armed military on their bases, having pregnant Argentinian women flown there to have their Argentinian babies and thus to claim rights based on "settlement", and even at one stage declaring Marambio, one of their Antarctic bases, temporary capital of Argentina, where they held a Cabinet meeting!

have given us the benefit of their advice through written communication and in meetings with team members, and many have expended much time and effort. I fear they are too numerous to list, but to them all I offer thanks, as I do to the British Antarctic Survey (whose work is so important) for advice and material on Antarctica. From within Government we have had support from the Foreign and Commonwealth Office and the Ministry of Defence, and useful advice from other Government Departments and from the Crown Agents.

I am most grateful to the Highlands and Islands Development Board for the loans of two of their staff to our team; and to Environmental Resources Limited for their assistance in the production of the report.

Our conclusions and recommendations are our own. It is right to conclude with thanks to my team. They have worked with great enthusiasm and application, despite the pressure of keeping other professional commitments at the same time. We have enjoyed our task, and hope that the study we have written will be of some value to those in Government who will have difficult decisions to make.

AUGUST 1982

SECTION TWO

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

2.1. Background

2.1.1. In our 1976 socio-economic survey of the Falkland Islands, our general conclusions were that, in spite of some major disadvantages of geography, communications, population size, a certain lack of social cohesion and initiative, and the overhanging Argentine political dimension, the Islands had been and could continue as a viable economic community provided certain urgent problems were tackled. Briefly the most important of these were the need:

(a) for reinvestment in agriculture and to stem the flow of funds from the Islands;

(b) to widen the ownership of farms in order to create opportunities for independent Falkland Islanders to have a stake in the Islands, and generally to create more diversified job opportunities to stem the emigration of young Falklanders;

(c) for a strong local government machine to initiate, assist and follow through on development opportunities.

Other areas also recommended for action included the extension of the permanent runway so as to improve external communications and the development of roads.

2.1.2. On certain of these matters listed, some action has been taken with indications of positive results. However, as will be discussed later, the degree of action would not appear to have been sufficient to solve the key underlying problems. But action required does not only concern HMG and the Falkland Islands Government, and we would draw attention to what we said in the Concluding Remarks of the 1976 Survey that:

> "economic development of the Falkland Islands on the lines we propose will ultimately depend for its success upon the degree of local commitment to the future of the Islands. By this we mean a commitment not only on the part of those who live and work in the Islands but also by those who have investments and derive benefit from the wealth created within the Falklands".

2.1.3. Changes in the external environment

However, before going on to discuss the present state of the Falklands economy and the outlook for the future, it is worth drawing attention to certain key

changes that have taken place during the 1976/82 period in the external ecomomic and political environment.

- Over the period wool prices have fallen by about 20 per cent in real terms.
- The 1979 Iranian crisis caused local energy costs to rise by about 20 per cent in real terms.
- The feeling of political uncertainty with respect to the Islands' future has persisted, at least as perceived by most Islanders and possibly also by potential investors. However, from discussions we have had with some of the latter, there is now a feeling that in this respect the climate for investment may have improved as a result of the retaking of the Islands.
- Now, of course, there is not only the overriding question of how Argentina will pursue its claim to the Islands in future, but also how far South American countries in the region might be prepared to co-operate in establishing any external communications links with the Falklands.
- The ownership of the largest company on the Islands, the Falkland Islands Company, which produces about 44 per cent of the wool and operates the Islands' internal and external shipping service, changed hands again. It is now owned by a UK industrial and fuel processing/distributing conglomerate, Coalite.
- International maritime law has developed in conjunction with the negotiations in the UN Law of the Sea Conference; for example, 200-mile limits have been widely adopted.

Clearly, the combination of the first two factors has had a considerable adverse significance for the Islands' economy. But of even more critical importance for the future is the establishment of regular external communications.

2.2. The economy of the Falkland Islands

2.2.1. The internal economy of the Falklands is in grave danger of collapsing in the next five years or so without continued support and/or development.

2.2.2. Over the 1974/80 period, the Gross Domestic Product of the Islands, which relies almost totally on the export of wool, has fallen by about 25 per cent—Section 3.2.2. The principal cause of the fall in GDP has been the decline in wool prices (in real terms), but wool output has also dropped by about 6 per cent since 1975/76, admittedly a good year—Section 6.2. Without a major upturn in the world economy, there is little prospect over the foreseeable future of wool prices doing much better than keeping pace with inflation.

2.2.3. The fall in farm company profitability has been even more catastrophic, with average margins in 1981 being about 4 p/kg compared to 26 p/kg in 1976. Investment has not been sufficient on many farms even to maintain existing assets—Section 3.3.5.

2.2.4. Even so, the total amount of funds in the form of undistributed profits and dividends leaving the Islands after taxation over the five-year period 1976/81 was about £1·1 million, substantially in excess of the total reinvestment in the

private sector—estimated very approximately at £0·6-0·7 million—Section 3.3.5. Compared to this outflow there was a considerably increased inflow of funds averaging around £1·3 million/year over the 1976-81 period—Section 3.4.2. UK Aid made up a sizeable proportion of the total—about 75 per cent.

This situation contrasts markedly with that prevailing before 1976, when the outflow of funds very considerably exceeded the inflow. From this outflow of funds the UK Exchequer over the 1951-73 period benefited to the order of around £2 million (in current, that is, historical, prices), about twice the amount of aid given to the Islands—Section 3.4.1.

2.2.5. The structure of the economy of the Islands has not greatly changed since 1976 in that the ownership of the 41 farms still lies largely in the hands of absentee companies, most of whom reside outside the Falkland Islands—Section 3.3.1. However, in response to a recommendation in the 1976 Report for creating small farm units, one farm, Green Patch, was subdivided into six units and sold off to owner occupiers, and another farm is in the process of being sold in six units. There is the prospect of one or two other farms being put up for sale over the next few years.

2.2.6. Depopulation of the Islands has continued, with a fall in total numbers of about 3 per cent over the 1975-80 period—Section 4.1 and 4.3. The shortage of young women remains a problem.

2.2.7. These very disturbing trends in the internal economy of the Falkland Islands have been to a considerable degree masked by a strong growth in income from abroad, so that Gross National Product has in fact fallen since 1974 by only about 4 per cent—Section 3.2.2. This overseas income growth has to a large extent been generated by increased proceeds from philately, which for the Falkland Islands in 1982 is expected to provide around £600,000 per year, nearly 14 per cent of GNP. Boosted by the recent publicity of the Islands, there is every prospect that this income will grow further still, possibly dramatically so.

2.2.8. Falkland Islands Government finances, in spite of considerably increased expenditure are also extremely healthy, having achieved a revenue surplus of £1·2 million since 1972/73—Section 3.5. This situation has been achieved partly by an increase (in real terms) in revenue from personal taxation and other charges, but also by revenue from abroad, including the philatelic income previously referred to. In view of the sharp decline in the domestic economy, a more expansionist policy would have been appropriate. The FIG has no permanent expertise for advice on and initiation of development with appropriate use of internal as well as external funds.

2.3. The impact of the garrison

2.3.1. The impact on the Falkland Islands of a garrison larger and possibly considerably larger than the community of 1,800, even after the rehabilitation period is over, is bound to be significant and, without considerable care, could be damaging in the longer term—Section 5.4. The effects will be both economic

and social. In the latter respect the community is less resilient than those of the Scottish Islands—Section 4.2.

2.3.2. In economic terms, the presence of the garrison provides opportunities and presents threats—Section 5.2. To the extent that it provides a larger home market for locally produced foodstuffs and for the tourist industry, the garrison is economically beneficial. Of concern is the potential effect of an enlarged retail and service sector, which could attract labour away from the primary producing sector, with the danger of causing the collapse of some farm units. It is unlikely that labour would return to farming after the construction phase, or if subsequently the garrison reduced in size.

2.3.3. Certain adverse social impacts of the garrison cannot be altogether avoided in a community of 1,800, and some tension between civilian and military sections of the population is likely from time to time—Section 5.4. Indeed, without great care the effect, particularly in Stanley, could be overwhelming. We are, nevertheless, encouraged by the Ministry of Defence's awareness of this problem reflecting the experience they have gained in garrison-community relations in the Western Isles of Scotland.

2.4. Changes necessary for the growth of the Falkland Islands' economy

2.4.1. In theory the option exists to allow current trends to continue with inevitable further contraction in the size of the economy and of the population. However, we presume that as a planning objective, a Falklands community with 1,000 or less, defended by a garrison of 3,000 or more, surviving economically principally because of income from stamps, is unacceptable. To arrest the potentially disastrous trends in the economy, the following changes are necessary:

(a) the continuing high drain on resources from the Islands in the form of remittance of undistributed profits and dividends must be stemmed;

(b) investment in farming must be encouraged, recognising the need to identify investment opportunities in improved agricultural productivity through continuing research activities;

(c) the economy must be diversified—development opportunities must be encouraged and supported where they exist, and investigated further where their commercial feasibility is not known;

(d) further opportunity and support must be given to allow Falkland Islanders to have an increased stake in their future, either through ownership or more direct involvement in decisions relating to their jobs;

(e) the government machine must be strengthened in order to manage the necessary changes referred to above and to initiate and support development;

(f) external communications and internal infrastructure must be improved if development is to take place;

(g) locally available sources of finance in the form of grants and loans must be introduced if development is to take place.

2.4.2. Finally, we would comment on the political dimension of Argentina's continuing claim on the Islands. In many respects we believe the war has removed some uncertainties as far as the climate for investment within the Falklands is concerned, so long as the normal ECGD-type insurance is available to all outside investors. As will be discussed, such guarantees would not remove the constraint to the offshore oil development, which is contingent on a political settlement with Argentina. It could also affect the prospects in the longer term for large scale offshore fisheries based on the Islands. Crucially, of course, it could have an impact upon the vital question of external air communications with the Islands. Without a regular air service many of the proposed future changes to and possible development of the economy will be impossible to realise. It is probable that such a situation would also be unacceptable to many of the existing population.

2.4.3. Before going into our specific recommendations, further discussion of the solution to the problem of outflow of funds/investment and of development opportunities is required.

2.5. Future ownership of the farm companies

2.5.1. We are of the opinion that a radical solution is required to stem the flow of funds from the Islands and to encourage reinvestment of profits. We reach this conclusion because of the combination of facts and circumstances relating to the existing absentee-owned farming operations in the Falkland Islands, which are likely to render other non-structural attempts to deal with the problem largely ineffective. The following points may be made:

- The current and expected continued level of farming profitability in the Falkland Islands is too low to generate sufficient finance to satisfy shareholders' expectations and the need for reinvestment to sustain farming output in the Islands.
- Even when they are identified, investment opportunities in Falklands sheep farming are unlikely to yield a return comparable with what can be achieved by placing profits in securities or in other investment projects in the UK.
- Farm owner-occupiers are more likely to be prepared to plough back profits inasmuch as they see their own long-term futures being bound up in their places of work. The fact that investment opportunities elsewhere may yield a higher return tends to be of lesser consequence than for outside shareholders.*

2.5.2. Judging by the investment record since the 1976 Report drew attention to this unsatisfactory state of affairs, exhortation is clearly insufficient. Improving capital allowances and grants clearly can help the situation—there is some indication (see Section 3.3.5, para. 2) that the raising in 1979 of capital allowances to UK levels has had some positive effect; and we believe that a system of such grants, loans and allowances similar to that operating in UK agriculture intro-

*It would of course be necessary to secure owner occupiership for someone who genuinely has this attitude rather than one intent on possible short-term capital gain because of a temporary improvement in land values resulting, say, from an upward cycle in wool prices.

duced into the Falkland Islands would raise investment levels. However, without a concomitant change in ownership pattern the danger is that a principal medium-term effect of such allowances and grants might be simply to raise all the levels of undistributed profit remittance to the UK.

2.5.3. Lastly we would observe that the future role of the Falkland Islands Company, owning 43 per cent of the land in the Islands and with its highly visible offshore ownership, has to be considered. In the 1976 Report we commented on the need for some institutional solution to be found for the Falkland Islands Company, to ensure that the interests of the Islands were taken into account in major decisions and policy formulation of the Company. But we would also wish to note that the Company's investment record has been no worse that most other Falkland Islands farming companies, and in recent years has probably been better than the majority.

2.6. Development opportunities and the resource potential

2.6.1. Development opportunities fall into three or possibly four categories:

(a) those within the Islands that have immediate potential;

(b) those within the Islands in terms of the potential or possible resource base, but whose exploitation is not commercially proven;

(c) offshore resources, the exploitation of which cannot be justified by commercial criteria.

Offshore hydrocarbons fall uneasily into the last category since the exploration, as distinct from exploitation, of oil is an activity which itself generates income and possible employment. However, some form of political agreement with Argentina is a pre-condition for such activity to proceed on any significant scale.

The offshore resources include potentially very large fishery resources off South Georgia and the South Sandwich Islands.

In the following sections we will also discuss those potential diversification activities which in our view have no commercial feasibility.

It should be noted that most manufacturing or resource extractive industries in the Falkland Islands would have to overcome the generally high costs of local production (materials have to be imported), lack of local skilled labour, high energy costs and long distance from markets. In the short to medium term, therefore, it is industries based on high-value products that are most likely to be commercially viable. In the long term, as the world's more economically accessible resources become exploited, those of the Falklands and its Dependencies could be in demand.

2.6.2. Agriculture

The raising of the value of agricultural output, apart from the question of reinvestment, is largely dependent upon scientific and economic solutions being found to improve the biological productivity of the soil and pasture, in the light of the generally limiting climatic and geological conditions—Sections 6.1.1 and 6.3. To this end, the work of the Grasslands Trials Unit must be expanded so that timely results are achieved—Section 6.7.

Some scope exists for agricultural diversification to supply more foodstuffs to the expanded home market and to visiting ships. This could be carried out by two or so smallholdings, and the smaller farms. Significant home supply of mutton and vegetables to the garrison will not be possible in the short term—Section 6.4.

The social and longer term economic advantages of creating independent small farm units have already been argued. However, there is as yet no sustained evidence that this will increase agricultural productivity and it could, without co-operation between small farms, have the opposite effect. Also, in the short to medium term, the creation of owner-occupier small farm units will lower FIG tax revenues—Sections 6.5 and 3.5.2.

2.6.3. Mutton exports

On the face of it, there should be an economic opportunity to increase agricultural revenue by exporting those carcasses, some 20,000 a year, currently discarded as being excess to local needs. These needs will in fact increase with the garrison. However, apart from the problems of integrating flock management for wool production with that for meat production, the local costs of slaughtering, butchering and freezing appear too high for the project to be economically justified—Section 6.4.2.

2.6.4. Tourism

An immediate commercial potential exists for the operation of a small but worthwhile wildlife tourist industry. The possible revenue and job creation benefits are not very large, with the potential net GDP contribution of the order of £120,000-180,000 a year. The figure would at least double if the Islands became accessible to Argentinian tourists again. To realise this potential, the Islands would require a regular external air service and a considerable injection of government aid, in order to initiate development and provide support—perhaps of the order of £1·5-2·0 million in the first five years—Section 8.

2.6.5. Wool processing

The potential exists for the development of a distinctive Falkland Islands knitwear industry using locally spun wool. To establish its economic viability further investigation by the Development Officer into the feasibility of production in the Falklands and of marketing methods in the UK, would be required. It is estimated that, if successful, the industry could contribute £0·25-0·30 million a year to the Falklands economy—Section 9.2.2.

Other ways of adding value to wool exports and hides are generally not considered likely to be commercially viable—Section 9.

2.6.6. Alginates

It is possible to extract from the giant seaweed (kelp) surrounding the Islands, alginic acid from which a range of alginate products, used mainly in the food and drinks, textile, rubber and paper industries, can be manufactured. However, as a result of introduction of cheaper synthetic substitutes in some markets,

the world demand for alginates has considerably shrunk in the last six years or so and cheaper sources of supply have come on to the market. We therefore find it hard to believe in the commercial viability of a new proposed seaweed harvesting and alginates production project recently put to the Islands' Executive Council by an American firm. Nevertheless, if it were successful it could eventually contribute £40,000 a year in royalty earnings, and a further £0·5 million a year in net income—Section 10.

2.6.7. Fisheries

The fisheries potential is best considered in three parts: the coastal and inshore potential, the offshore areas, and the Southern Ocean off South Georgia.

Coastal fisheries—Section 7.2.

There is no tradition of inshore fishing among Falkland Islanders, and the demand for fish will not support more than one or two small boats. However, two potential export opportunities deserving of immediate practical investigation are salmon ranching (7.2.4) and shell fish fisheries (7.2.3).

A recent ODA-funded survey of the Falkland Islands was sufficiently positive in its conclusion to recommend an immediate attempt to establish a salmon run at a cost of around £0·5-0·6 million over 3-5 years[1]. If successful, a full-scale commercial ranching operation would require investment of £5-10 million, for which it is believed private capital would be found, and might eventually yield £1 million a year in income. To be successful markets would have to be found, and this should also be the subject of study.

According to the ODA, the development of a shell fish fisheries would first require a survey lasting three years and costing some £0·75 million. The results would have to be highly favourable if a commercial investment was to be attracted, and marketing factors would again be critical. If if eventually were successful, subsequent investment would need to be of the order of £7-14 million, and suitable skilled labour imported for both fishing and processing. Eventual income contribution might again be of the order of £0·7-1·2 million.

The Falkland Islands offshore fisheries—Section 7.3

The offshore fisheries potential of the entire Patagonian Shelf is roughly estimated at 4-5 million tonnes a year, of which the stocks with greatest potential are a species of hake, already fished by the Poles, squid and blue whiting. Other nations, including the Germans, Japanese, the Spanish (in collaboration with Argentina) and occasionally the Russians have fished the area in an exploratory way. Not including the Poles, who are in special economic circumstances, there are currently very little commercial-style fisheries in this area, and it may be that development would not come about for some years[2]. When it does, it is possible but not certain that it might most economically be prosecuted from the Falkland Islands, the catches being processed onshore and exported.

[1]The European Investment Bank has shown interest in funding this pilot project.
[2]The North Atlantic blue whiting potential is not yet exploited by the UK.

There is a good case for the UK to mount an exploratory fishing project, costing some £20 million over five years, aimed at assessing the future commercial potential of this resource and the best way to exploit it. Any eventual sizeable fishing operation would require protection, proper resource management and very considerable harbour and other infrastructure development with significant impact upon the Falkland Islands.

Recommendations relating to this activity are discussed in Section 7.3.8.

The Southern Ocean—Section 7.4

South of the oceanographic phenomenon known as the Antarctic Convergence, lies the world's largest untapped source of protein—Antarctic krill. South Georgia is in the centre of the area in which much of the krill resource occurs. There are also excellent but small and depleted fin fish resources. Krill, while caught in relatively small quantities today—about 0·6-1 million tonnes a year*, chiefly by the Russians and Poles—is unlikely to be commercially exploited until an economic and acceptable product(s) has been developed. Sustainable yields may be very large, 50-150 million tonnes a year; the total world fish catch is currently 75 million tonnes a year. While the long-term exploitation of krill may well have no relevance to the Falkland Islands, the British have fishing and fish processing expertise at least as suitable as any other nation for exploratory work.

2.6.8. Hydrocarbons—Section 11

As already indicated, the international oil industry will not undertake offshore exploratory drilling until a stable political climate exists in the region. The sedimentary area of principal interest is the Malvinas Basin lying between the Islands and Patagonia. Since the time of the 1976 Report, a seismic survey has been carried out on the Falklands side of the median line between the Islands and Argentina, and exploratory drilling, some of it 100 miles offshore, has taken place on the Argentinian side. The drilling has proved the presence of gas and oil in the Basin, but not so far in commercial quantities, and the flow rates achieved together with the seismic evidence would so far suggest that the province is not fulfilling hopes based on its geology. To be commercial, oil deposits would have to be very large. Even so, there is no doubt that oil companies would pursue exploratory drilling once a stable licensing regime were established.

The sedimentary areas further to the east along the Andean chain to South Georgia and down to the Antarctic peninsula (Grahamland) may well contain hydrocarbons, but the water depths and weather make this vast region very much less attractive. A discussion of the potential of the Antarctic, for which the necessary exploration/production technology does not currently exist, is given briefly in Section 11.1 (para 2) and in Appendix Four.

2.6.9. Comment

It can be seen that the resource development potential of the Falkland Islands may well principally be in the longer-term future, rather than represent an

*This is roughly the same as the UK fish landings of the entire British fleet.

immediate opportunity to diversify the economy. Nevertheless, we believe that exploratory action can be justified on several fronts if only to inform the British Government of the true position with regard to the marine resources of that part of the South Atlantic. Whatever longer-term political developments may take place, the fact is that Britain is currently committed to a presence on the Islands, and opportunities should therefore be taken. Similarly, the British Government should take early steps to inform themselves on the potential value of the marine resources of that part of the Southern Ocean adjacent to South Georgia and, in particular, whether it is technically and economically feasible to exploit them from bases on South Georgia.

2.7. Communications and infrastructure

2.7.1. External communications—Section 12.1

The establishment of regular civil air communications with the Islands is an absolute priority. Without it, little or no development would take place, the economy would decline further, and the sense of isolation would probably be unacceptable to the majority of Falkland Islanders.

Quite apart from military requirements, a permanent runway will therefore be required, not less than 8,500 ft in length so as to be capable of receiving medium-haul jets direct from South American cities. The cost of such a development could be of the order of £30-35 million—Section 12.1.3.

In spite of the obvious disadvantages of having to cross Argentine airspace, the most economic and, compared to Montevideo, flexible air service would be weekly flights to Punta Arenas in turbo-prop aircraft seating 40-75 passengers. Such an air service would still require an annual government subsidy of £0·2-0·25 million a year. Even a much higher cost route to, say, Rio de Janeiro would have to involve Argentine air traffic control. The Ascension Island route would only be worth considering if charter flights at infrequent intervals had to be accepted—Section 12.1.4.

Although the current shipping service provided by the Falkland Islands Company is adequate, there may be real benefit in the Falkland Islands being linked to the St Helena/Ascension Island shipping service, especially if development is to take place—Section 12.2. It might be, if an air service to the mainland could not be established, that the much less satisfactory option of a shipping service to Punta Arenas or Montevideo would have to be introduced.

The Falkland Islands should be borne in mind as a possible forward base and communications centre for the investigation and development of the resources off South Georgia.

2.7.2. Internal communications and infrastructure

The development of roads in the Islands, which has begun with the construction of a gravel surface road from Stanley to Goose Green/Darwin, is highly desirable from the social point of view, and would undoubtedly facilitate development—Section 12.3.2. The effective development of smaller farm units could depend upon it. However, a complete network would be costly (£10-15 million), and the annual maintenance cost, about £1 million a year to the Falkland Islands

Government, could be almost prohibitive unless major development took place.

Careful planning of internal transport development will be necessary in the short to medium term future—Section 12.3.2 (para. 2).

The state of repair of the Falkland Islands jetties is generally poor—Section 12.4. A new main all-purpose jetty will be required in Port Stanley, capable of receiving larger, more versatile ships and, possibly, fishing vessels alongside. While such a development, costing £3-3·5 million, could not be economically justified on immediate requirements, it will be necessary if the Islands are to develop.

In view of the high cost of electricity and petroleum fuels in the Islands, there would appear to be some cost reductions realisable through installation of wind turbine generators and/or possibly a peat fuelled electricity generator (the latter in Stanley)—Section 12.6.

RECOMMENDATIONS

2.8. Introduction

2.8.1. In the following sections we set down our principal recommendations for action, seen as necessary to arrest the decline of the internal economy, to diversify the economy and to explore the offshore potential of the Falklands and their Dependencies. The main sections of the report contain some more detailed points for action which are not fully set out in the recommendations listed here. It should be pointed out that recommendations relating to tourism, shell fish and offshore fisheries would be contingent upon satisfactory external communications being established.

2.9. The Falkland Islands Development Agency

2.9.1. We **recommend** the creation of a Falkland Islands Development Agency (FIDA). Its role would be somewhat similar to the Highlands and Islands Development Board in that it would:

- be the agency for the local allocation of development loans and grants to new enterprises;
- take up shares in and sometimes wholly own particular development enterprises and services.

But it would also be the agent for buying and selling farms (or shares in them) during the course of the recommended ownership transfer of Falkland Islands' farms—see Section 2.10.

2.9.2. It is envisaged that the FIDA would be created under the administrative and financial umbrella of the Overseas Development Administration, who would provide the initial capital funds and necessary annual grant. It would nevertheless be based in the Falkland Islands, and be managed independently within the Falkland Islands under the appointed Chief Executive. The board should include representation from HMG, the Chief Executive, an elected Councillor, and appropriate individual(s), and it should be chaired by the Civil Commissioner. It would be policy advisory in nature. It is also envisaged that it would

receive a certain grant allocation (not necessarily fixed) from the Falkland Islands Government. There would, for example, be a case for transferring the existing Falkland Islands development fund to the FIDA.

2.9.3. It should be emphasised that the FIDA is seen as the necessary catalyst and agent for development in the Falkland Islands, and the mechanism for bringing about reinvestment of funds generated in the Islands.

2.9.4. Its policy should wherever possible be to secure local capital investment in development projects, and FIDA may well have to be discretionary in deciding what percentage of finance (and shares) it should provide in the way of grants for a new venture. Nevertheless, ground rules for grant and loan allocation policies would need to be drawn up for FIDA, according to the type and size of venture involved. In this respect it should seek advice from the Highlands and Islands Development Board.

2.9.5. For the purposes of operating a development fund for initiating and supporting projects in agricultural diversification, tourism, knitwear, etc., an initial share capital creation for FIDA of the order of £2 million would seem sufficient, with appropriate annual fund allocation from ODA of perhaps around £0·5 million.* In time, it would in fact be designed to become the principal vehicle of aid to the Islands. However, since its role will encompass the purchase and sale of farms, and possibly in time the takeover of certain non-profit making services such as the internal shipping company, its capital would need to be larger, possibly of the order of £10-15 million. However, a close definition of the optimum capital structure and financing of the Falkland Islands Development Agency would require more detailed study.

2.9.6. FIDA will require some administrative back-up but it is envisaged that this could be financed out of FIG funds.

2.10. Transfer of farm ownership

2.10.1. We **recommend** that urgent steps be taken to transfer the ownership of absentee-owned farms, with the main objective of creating as far as possible owner-occupied smaller farming units. However, it is not proposed that this should be effected by an outright purchase of shares by HMG with the title being transferred to the Falkland Islands Government in a manner similar to that which took place in St Helena in 1968, when the Government was obliged to take over the majority of shares in the largest trading company on the Island.

2.10.2. The programme is envisaged as having the following key steps:

- The shares of appropriate Falkland Islands farming companies would either be purchased by a suitable government agency or financial institution and then immediately sold to the FIDA, or purchased directly by the FIDA acting through a body such as a merchant bank.

*This could be flexible.

- The FIDA, advised by the Agricultural Officer, key members of the Grasslands Trials Unit and other co-opted Islanders with knowledge of farming in the Falkland Islands, would formulate a farm development plan for the Islands. We recognise that an extensive system of farming will remain appropriate for part of the Falklands. The pace and extent of small-farm creation will depend not only on the numbers of suitable owner-occupiers who can be found, but also on the rate at which the necessary supporting infrastructure can be provided for such a development. Some action on transfer of ownership should take place before the detailed completion of a plan for the whole Islands.
- The FIDA would:
  - as a first priority sell farms to Falkland Islanders or to suitable outsiders; or
  - arrange appropriate tenancies, itself acting as landlord.

  It should also consider other forms of ownership and operation such as co-operative ownership, share-farming, etc. It is not intended that the FIDA should in the long run be responsible for the direct management of farms, although we recognise that it may have to make provision for this in the short term.

Under any arrangement, the knowledge and skills of the farm managers and farm workers will continue to be an essential contribution to the farming of the Falklands. We believe our proposals will help to secure their future in the Islands.

2.10.3. We gave **consideration** to the process of ownership take-over by FIDA being a gradual process, with the selection of the optimum candidates for control at the beginning. However, such a gradualist approach would have the serious disadvantage of causing even more investment blight on the farms not immediately approached. We therefore **recommend** the purchase of all farms owned by absentee landlords as soon as is practically feasible, followed by sale to the Falkland Islands Development Agency. This approach also has the advantage of not being seen as discriminatory.

The cost of purchasing absentee-owned farms in the Falkland Islands would probably be of the order of £13-18 million. The method of evaluation would need to strike an acceptable balance between that based on the present value of future earnings potential (£8-11 million) and that on the present sale value of sheep (£13-19 million).

2.10.4. As a secondary, and hopefully unnecessary, option there may also be merit in the Falkland Islands Government passing legislation for the Government to obtain compulsory powers to purchase the farms or obtain freehold title to the land. However, the latter exercise would be less satisfactory.

2.11. Development recommendations

2.11.1. Agriculture

Apart from the enlargement of the Agricultural Office, facilitation of agricultural

diversification and the creation of small farm units (discussed in Section 2.10 and recommended for assistance), we **recommend**:

(a) *the expansion of the Grasslands Trials Unit* to enable it to recover from the lost time caused by the damage to its establishment and records, and also to recognise the need for timely results on research in pasture improvement and Falkland Islands farming methods if economic benefit is to be reaped from their work—Section 6.7.2; initial capital cost—£0·27 million; additional annual cost of larger staff—£0·35 million. The discounted cash flow (DCF) return of expenditure on an expanded GTU would yield around 6 per cent over 20 years but, as discussed in Section 6.7.2, the economic justification is best seen in terms of the marginal cost against the alternative of prolonging the GTU's necessary work period until such time as results had been achieved;

(b) *the introduction of farm production and improvement grants and subsidies*, similar to that in the UK, which should take account of administrative factors—Section 6.7.2; roughly estimated annual cost £0·3 million a year;

(c) *the introduction of rural science in the school syllabus.*

2.11.2. Fisheries

Recognising that some investigatory work by the ODA has already been initiated by the ODA in Falkland Islands coastal fisheries, we **recommend**:

(a) support for a *survey of shell fish fisheries* around the coasts of the Falkland Islands—Section 7.2.3.2; estimated cost £0·75 million over three years;

(b) if necessary, lending financial support to a *salmon ranching pilot scheme* once the reconnaissance survey is complete—Section 7.2.4.2; the full cost of this exercise is likely to be £0·6 million over three years, although it is possible that the European Investment Bank and/or private investment may also be found;

For the offshore fisheries on the Patagonian Shelf we **recommend**:

(c) the *establishment of a 200-mile fisheries limit* around the Islands—Sections 7.3.5.1 and 7.3.8.1 explain the advantages of a 200-mile limit;

(d) the mounting of an *exploratory fishing project* within the 200-mile limit, involving the chartering of British registered commercial fishing vessels and the temporary deployment of the R.V. *George Reay* and the staff of the Torry Research Station and Fisheries Laboratory—Section 7.3.6.2; estimated cost £20 million over five years;

(e) following establishment of a 200-mile limit, negotiations with Poles *extending fishing rights in exchange for information on the fishing*—Section 7.3.6.5.

For the Southern Ocean area, we **recommend**:

(f) *establishment of a 200-mile fisheries limit around South Georgia, the South Sandwich Islands and the Shag Rocks*—Section 7.4.5.1;

(g) consideration be given to investigating, if possible through a revived UN Southern Ocean Fishing Project, the *technical possibilities of*

fishing both krill and fin fish in relatively small motor fishing vessels from South Georgia—Section 7.4.5.3.

The recommendations relating to off-shore Patagonian Shelf and Southern Ocean fishing should be viewed in a wider and longer-term context than that simply of the development of the Falkland Islands.

2.11.3. Tourism

Once an external air service has been established, we **recommend**:

(a) active financial support being made available, most appropriately through the Falkland Islands Development Agency, to *the development of a tourist venture involving promotion activities with wildlife tourist operators*, the operation of a small but suitable boat, the development of accommodation in places of interest and of the necessary conservation/resource management regime—Section 8.4; estimated cost £0·7 million over five years; other sources of private and public finance should be sought, for example, the European Investment Bank;

(b) the *building of a new hotel in Stanley*—Section 8.2; cost £1 million; it should be noted that if other development is to take place, there will in any case be a need for a new hotel in Stanley;

(c) the *active involvement of the British Tourist Authority* in promotion.

2.11.4. Knitwear

We **recommend** that the development of a distinctive Falkland Islands knitwear industry should be an early priority for the Development Officer and be eligible for development grants from the Falkland Islands Development Agency—Section 9.4; cost approximately £0·2 million.

2.11.5. External air service

We **recommend** that:

(a) *the new runway* should be not less than 8,500 feet, capable of receiving medium-haul jets direct from South American cities and DC 10s from Ascension Island—Section 12.1.3;

(b) *as a matter of the highest priority, steps be taken as politically appropriate to establish a civil external air service:*

(c) *the new air service* be operated by a contract airline operator under the Falkland Islands Government—Section 12.1.7. On the grounds of cost, taken together with the need for reasonable flexibility of onward connections, the optimum service is considered to be via Punta Arenas.

2.11.6. External shipping service

In view of the more flexible shipping service likely to be required if development is to take place, we **recommend** the investigation of the potential benefits of other *direct charter arrangements*, such as linking the Falkland Islands to the St Helena/Ascension Island shipping service—Section 12.2.

2.11.7. Roads

We **recommend** the *road network in the Camp should be expanded* once the Stanley to Darwin/Goose Green road is completed—Section 12.3.2. The design of the road system should take account of the infrastructure needs of small farm development. However, because of the high costs to FIG of road maintenance, the cost/benefits of further expansion of Camp roads should be assessed after five years: cost estimate £3-5 million over five years. To sustain this level of expansion, overseas contract labour supervised by the Public Works Department will be required.

2.11.8. Deep-water jetty

We **recommend** the construction of a new Stanley all-purpose jetty, allowing the unloading of ships of up to 8 metres draught, container handling and more efficient operation—cost £3·0-3·5 million—Section 12.4.1.

2.11.9. Energy supplies

We **recommend** that:

(a) military aircraft stationed on the Falkland Islands should use J.P.1. Avtur kerosene fuel so that a common fuel supply system with civil aircraft can be employed;

(b) in view of the high cost of gas oil/diesel and power in the Islands, ODA support should be given, if economically justifiable, to the installation of a 200-250 kW wind turbine in Stanley and smaller 3-10 kW units in the Camp—Section 12.6.3; also consideration should be given to the use of peat-fired thermal generator units in the future expansion of Stanley power supplies—Section 12.6.4.

2.12. The garrison

2.12.1. In spite of the significantly higher costs involved, we urge **consideration** to maximising the number of women in the garrison and allowing accompaniment of married servicemen by their wives. Also, we **recommend** that the garrison should aim to provide most of the civilian maintenance, NAAFI and other ancillary service personnel it requires.

2.12.2. We **recommend** that under whatever arrangements are agreed for co-operation between the Civil and Military Commissioners there should be a Falkland Islands Civilian/Military Liaison Unit which would include the proposed Chief Executive. The Unit's role would be to promote and help organise economic and social benefits arising from the presence of the garrison, for example, as a market for locally produced food, and to advise on necessary steps to limit adverse impacts.

2.12.3. We also **request** that once the airfield construction and rehabilitation period is over, **consideration** be given to allocation of any spare capacity in the Royal Engineers to assisting with infrastructure development in the Falkland Islands, including road development—Section 12.3.2.

2.13. Government structure

2.13.1. A key recommendation of the 1976 Report was the enlargement and strengthening of the government machine (Vol. 2, Chapter 20). The purposes of this recommendation, which are even more valid today, can be summarised as:

- to secure the effective and timely implementation of development proposals necessary if the economy is to be regenerated;
- to establish a more dynamic growth-oriented government;
- to provide a local source of commercial and development expertise, capable of negotiation with private commercial interests on behalf of the future economic and social interests of the Falkland Islands.

In addition, we see the function of the government to plan and co-ordinate future development efforts, having in mind the manpower, infrastructure and finance needs as well as the Islands' limitations in this respect. Attention would also need to be paid to the potential impacts of development and of the garrison upon the environment and the local community.

2.13.2. As in the 1976 Report, we **recommend** the appointment of:

(a) *a Chief Executive*, reporting to the Civil Commissioner and responsible for:
- acting as Chief Executive of the Falkland Islands Development Agency;
- directing the government departments through the Chief Secretary;
- drawing up development objectives, plans, priorities and budgets, and monitoring of subsequent progress;
- planning and administering the transfer of ownership of absentee-owned farms;
- high level negotiations connected with this process and with the establishment of new industries and enterprises;
- development expenditure and broad fiscal policy in collaboration with the Financial Secretary.

(b) *a Development Officer*, reporting to the Chief Executive with responsibility for:
- encouraging and advising existing enterprises, and seeking opportunities for creation of new ones;
- investigating and developing overseas markets;
- co-ordinating efforts with the London office of the Falkland Islands Development Agency and other external institutions;
- assisting with garrison liaison and development aspects;
- advising on allocation of development funds and assisting with negotiations with new enterprises;
- acting as a principal officer to the Falkland Islands Development Agency;
- initiating necessary training activities for Falkland Islanders;

and after a year or so:

(c) *a Farm Management Officer*, reporting to the Agricultural Officer. His particular role would be concerned with:

— advising newly created small farms on farm business management;

— the administration of agricultural grants and loans.

2.13.3. A Development Officer has in fact already been appointed but has not yet taken up residence in the Falklands. In later years, it is likely he would need assistance. The argument for the creation of the post of Chief Executive is now even more pressing than in 1976, given the other recommendations now being put forward regarding the setting up of a Falkland Islands Development Agency (see 2.9), and the transference of farm ownership (see 2.10).

2.13.4. However, even if none of our development and structural recommendations were taken up, it should be recognised that the public sector will continue to expand (and the existing private sector would probably contract further) as revenue from foreign investments and philately grows. Currently, the Falkland Islands Government simply does not have the necessary financial expertise to ensure these resources are allocated in the optimum manner on a continuing basis for the future maintenance let alone development of the Falkland Islands' economy.

2.13.5. Local legislation could be necessary for the creation of the post of Chief Executive, and there could be constitutional implications. Other comments and suggestions made on pages 89 and 90 of Vol. 2 of the 1976 Report regarding the proposed new Government organisation and responsibilities are still valid.

2.13.6. We **recommend** re-examination of possibilities for fuller participation of the Islanders in the running of local affairs, for example, through the establishment of community councils (at the very least the restoration of Stanley Town Council) and changes in the composition of the Councils of FIG—see Section 4.2.5.

2.14. Finance for development

2.14.1. The cost of recommendations itemised in the previous section can be divided into the following categories:

(a) *cost of manpower* necessary to strengthen the government machine, effect the transfer of farm ownership and expand the GTU activities;

(b) *development aid* required to achieve diversification and expansion of the economy;

(c) *financial support* for offshore fishing projects and in the Southern Ocean.

Costs are expressed in 1982 prices.

2.14.2. Cost of expanded Falkland Islands Government service

The approximate costs set out below give estimates of the full annual salaries plus other benefits and their accommodation expenses.

Government service

TABLE 2.14(a)

Costs of recommended expanded government services (£000s)

	1984	*1985*	*1986*	*1987*	*1988*	*Accumulated Total*
Chief Executive	55	55	55	55	55	275
Development Officer	35	35	35	35	35	175
Asst. Devpt. Officer	—	—	30	30	30	90
Farm Management Officer	35	35	35	35	35	175
Expanded GTU	200	350	350	350	350	1600
Net subsidy of External Air Service	250	250	225	200	200	1125
London office of FIDA	40	40	40	40	40	200
Total	615	765	770	745	745	3640

Falkland Islands Development Agency

It will be noted that the extra staff necessary to manage the Falkland Islands Development Agency's agricultural interests after the takeover of absentee-owned farms in the Falkland Islands and before sale-back to Falkland Islanders is assumed to be financed from revenue from farming activities.

2.14.3. Cost of effecting transfer of farm ownership

The approximate cost flow to HMG of carrying out this exercise is very broadly assessed as follows:

TABLE 2.14(b)

Cost of achieving transfer of farm ownership (£ million)

	1984	*1985*	*1986*	*1987*	*1988*	*Total*
Initial capital	7–10	6–8				13–18
Financing fee	0·8	0·7				1·5
Farm sales revenue		(0·05)	(0·10)	(0·15)	(0·20)	(0·5)
Total	4·5–5·5	3·5–3·5	(0·10)	(0·15)	(0·20)	14–19

However, it is reasonable to assume that loan repayments for purchase of the farms from FIDA would remain in the Falkland Islands, and have the effect of rendering FIDA reasonably financially self-sufficient in the future.

2.14.4. Development aid

Estimated development aid expenditure is summarised in Table 2.14(c) below.

TABLE 2.14(c)

Recommended development grant aid (£ million)

	1984	*1985*	*1986*	*1987*	*1988*	*Total*
Falkland Islands Development Agency						
—tourism	0·25	0·40	0·65	0·35	0·07	1·7
—knitwear	0·20	0·10				0·3
—other	0·10	0·10	0·20	0·20	0·20	0·8
Sub-total	0·55	0·60	0·85	0·55	0·27	2·8
GTU expansion	0·3					0·3
Agricultural grants	0·3	0·3	0·3	0·3	0·3	1·5
Salmon ranching*	0·2	0·1				0·3
Shell-fish survey	0·2	0·2	0·2	0·15		0·7
Roads	1·0	1·0	1·0	1·0	1·0	5·0
Jetty	1·0	1·0	1·0			3·0
Total	3·55	3·2	3·35	2·0	1·6	13·7

*Represents three-fifths of total cost required, and may not be needed if EIB fund project.

If this development programme is carried out, there may be some additional overall expenses in order to provide sufficient office space, transport means etc.

Our information is that the runway will be primarily a military expense, and it is not possible to say what additional civil expenditure might be necessary—see also Section 12.1.3.

Also we have not included any aid finance that may be required to complete existing PWD projects or new, mostly renovation, projects in Stanley.

2.14.5. Finance for exploratory fishing

In the two distinct areas considered, the following are **recommended**:

(a) Exploratory fishing project offshore Falkland Islands
—over 2-5 years — £20 million

(b) UK role in revived UN Southern Ocean Project
—5 years — £20 million

2.14.6. FIG expenditure

We have not included any expenditure by the Falklands PWD for refurbishment and improvement of buildings and infrastructure in Stanley. Some of this will in any case be dealt with under rehabilitation expenditure following the war. Nor has any provision been made for housing expenditure to accommodate an enlarged population in the future. The larger proportion of any population increase would likely be beyond the next 3-5 year time-frame, and would depend upon the results of investigations made in this period.

2.14.7. Comment

There can be no avoiding the fact that the public funds required to implement the regeneration of the Falklands economy and to provide the means for investigating and to some extent realising the development potential of the Islands are quite substantial, relative to the size of the population. Ignoring the finance required for exploratory fishing, which we believe should be judged in a wider and longer-term context than development of the Falkland Islands, the sums proposed in 2.14.3, 2.14.4 and 2.14.5 above amount to about £30·6-35·6 million over the five-year period (approx. £6-7 million a year). This is equivalent to £3,245-3,786 per Falkland Islander per year. For comparative purposes it is of note that St Helena in 1980-81 received some £615 per person per year and those in the Western Isles of Scotland received in total from Central Government approximately £644 per person per year (not including certain social welfare benefits such as pensions and unemployment). As already noted, expenditure on exploratory fishing in the further offshore areas and off South Georgia should be viewed in a wider context than simply the development of the Falklands.

Some of these funds required are not strictly for development—some are for financing a restored air service and funds for new FIG staff principally concerned with administering change in the economic structure. Also £8 million of the total is for infrastructure which most communities at their stage of development and age might expect to have anyway. Equally, it should be recognised that improvement of the infrastructure in this way (roads and new jetty) does not in itself guarantee that economic development will take place on any significant scale. However, the absence of such infrastructure presents a major constraint to development. If all the onshore and coastal development projects come to commercial fruition, and such optimism is probably not justified, it is roughly estimated that the economy might expand by around £3-3·5 million a year, representing a 75-90 per cent increase over the present GDP. This might create a further 165-200 direct jobs and perhaps a further 25-40 indirect jobs. This might result by the late 1980s in a population expansion of 350-500. In the longer term, if a large scale fisheries industry was to be developed, this number would increase substantially.

The Falkland Islands economy is at a critical stage: if funds are not made available now for necessary change and development, the cost of supporting the Islands over a long period of further decline could be considerable. The Falkland Islands do have a resource development potential but much of it may be in the longer rather than the short term. Furthermore, if public money is not to be wasted, it is in this interim period that the commitment of the Islanders will be tested.

SECTION THREE

THE EXISTING ECONOMY AND ITS PROSPECTS

3.1. Introduction

3.1.1. In this section we examine the principal features of the Falklands economy, how it has changed since the time of the 1976 Report (in which 1974 was the latest year reported), and the prospects for the future. In particular the section considers:

- National Income/Gross Domestic Product (GDP),
- The performance of the private sector, including investment;
- Flow of funds to and from the Islands;
- Falkland Islands Government finances;
- Banking and finance.

3.2. National Income

3.2.1. The economy

The 1976 Report identified the most striking feature of the Falkland Islands' economy as its almost total dependence on the production of wool for export, pointing out that, in consequence, both total community income and government revenue tended to fluctuate with movements in world wool prices. Apart from some strengthening of government revenue from other sources, this statement is as true in 1982 as it was in 1976.

The 1976 Report included a computation of Falkland Islands national income using only income statistics, in the absence of other data, for the ten-year period 1965-1974. The picture that emerged was of considerable variations from year to year in GDP arising from the sharp fluctuations in the trading profits of companies. When wool prices were high, trading profits represented (by international standards) a very high proportion of total national income, the reverse being the case when wool prices were low. In real terms, at constant 1974 prices, GDP showed little or no underlying growth and, like the Gross National Product (GNP), had declined in the 1970s.

3.2.2. Change in National Income, GDP and GNP since 1974

In order to make some updated assessment of overall trends in the Falkland Islands' National Income since 1974, an attempt has been made to compute the figures for 1980 and 1977, and the results, together with 1974 for comparison, are shown in Table 3.2(a). It must be stressed that the figures presented in the table are essentially best estimates based on fragmentary information—but they serve to indicate broad trends.

TABLE 3.2(a)

Falkland Islands' national income at current prices (£000s)

	1974	*1977*	*1980*
Wages & salaries and incomes of sole traders & farmers	1,361·3	2,000·4	2,984·8
Payments in kind [1]	102·6	170·0	220·0
Pension contributions by employers	24·7	36·0	50·0
Trading profits of companies [2]	1,119·1	815·0	570·0
Rents [3]	70·4	109·0	150·0
Gross Domestic Product	2,678·1	3,130·4	3,974·8
Less net Falklands income transferred abroad [4]	480·4	183·0	52·0
Plus Government investment and other income from abroad [5]	110·1	302·0	452·0
Gross National Product	2,307·8	3,249·4	4,374·8
Less Depreciation [6]	98·9	131·0	170·0
National Income	2,208·9	3,118·4	4,204·8
Population	1,897	1,855	1,813
National Income per head	£1,164	£1,681	£2,319

[1] Free accommodation, mutton and peat to camp employees.
[2] Before charging depreciation.
[3] Government house rents and estimates of value of owner-occupied houses in Stanley.
[4] Dividends and unappropriated profits remitted abroad.
[5] Income of FIG from investment overseas (including transfers from savings bank), philately and seigniorage.
[6] Depreciation of company assets only.

Source: Team estimates based on information from FIG and some farming companies.

Table 3.2(a) should be looked at in conjunction with Table 3.2(b) which shows some of the key elements of national income for the three selected years at 1980 prices.

TABLE 3.2(b)

Main items of Falkland Islands' National Income at constant 1980 prices (£000s)

	1974	*1977*	*1980*
Wages & salaries and incomes of sole traders & farmers	2,690	2,494	2,984
Trading profits of companies	2,211	1,016	570
Gross domestic product	5,293	3,903	3,975
Gross national product	4,561	4,051	4,375
National Income	4,365	3,888	4,204
National Income per head	£2,301	£2,095	£2,319

Source: Team estimates (as in Table 3.1(a)) adjusted by Stanley Retail Prices Index.

Gross Domestic Product

It can be seen that, at current prices, GDP has increased by about 50 per cent between 1974 and 1980, the main growth having taken place in wages, salaries and incomes, which increased by 120 per cent. On the other hand, the trading

profits of companies fell by almost 50 per cent during the same period, declining from 42 per cent to only 14 per cent of GDP. At constant 1980 prices, GDP fell by a quarter between 1974 and 1980, wages and salaries having increased by 10 per cent and trading profits having declined dramatically, 1980 being a very bad year for the farming companies.

National Income/GNP

At constant 1980 prices, National Income has declined by almost 4 per cent since 1974. The reason why National Income has held up relatively well is that Government income from investments and philately has been buoyant. Because of this, and the fact that the population declined by 84 (4·4 per cent), National Income per head showed an increase, albeit a modest one, even at 1980 prices.

The overall picture, therefore, is one of serious decline in the domestic economy in real terms, a major shift of income having taken place from the trading profits of companies to the wages and salaries earned by individuals. The improved Government revenue from abroad, mostly from philatelic income, has helped to avert a potentially catastrophic trend in national income.

3.2.3. The future outlook

Unless a major upturn occurs in the world economy, the forecast for wool prices is that they will at best do no more than keep pace with inflation. The medium term outlook for the GDP of the Falkland Islands is therefore if anything one of further slow decline, and serves to emphasise the importance of development of new economic activity within the Islands.

The picture would be considerably worse were it not for the income from philately. In fact income from this source is expected to reach £0·6 million in 1982, and there is every prospect that this level of income can be maintained—see Section 3.5.2. The result will mean that the national income will actually expand in real terms in 1982 and should be maintained unless further shortfall in wool production offsets this lucrative source of income to the Islands.

3.3. The private sector

3.3.1. Structure

The private sector of the Falkland Islands' economy consists almost entirely of the various sheep-farming enterprises. There is a very small tertiary services sector engaged in distribution but, to all intents and purposes, there is nothing else.

In 1976 there was a total of 36 farm units managed by about 25 farming enterprises, of which 15 were companies and ten were partnerships or sole traders. Only four of the farm units could be defined as owner-occupied in that the resident farm managers or their immediate family held more than a 50 per cent interest in them. Eight of the companies were registered in the UK, six in the Falkland Islands and one in Jersey. The partnerships and sole traders tended to farm the smaller units, often the smaller islands, whereas the companies varied greatly in size. By far the largest was the Falkland Islands Company (FIC), which owned nine separate farming units comprising between them about 46 per cent of the total area of the Falklands.

While the overall structure of the farming industry in the Falklands has remained broadly the same, some noteworthy changes in the pattern of farm ownership have begun to occur in the past few years, albeit on a small basis. The 1976 Report proposed that steps should be taken to encourage the development of smaller farm units by selling or leasing parts of the larger farms to competent individuals who would farm them for their own benefits. In 1980 FIC sold its Green Patch Farm on East Falkland to the Government for the purpose of sub-dividing it into six smaller units which were then sold at subsidised prices with arranged finance on favourable terms to aspiring owner-occupier farmers selected from a considerable number of Falkland contenders. In 1981 Roy Cove, a farm on West Falkland, was also sold to Government for the purpose of sub-division. Six new units were in the course of being sold, two to non-Falkland Islanders: one New Zealander and one Scot.

3.3.2. Falkland Islands Company (FIC)

Although it now farms a smaller area than it did in 1976, FIC still occupies a dominant position in the Falklands economy, owning about 43 per cent of the total farm land, providing the external and operating the internal shipping services. It owns the greater part of the wholesale and retail distribution. It also provides basic banking services and plays an important part in marketing wool. Since the last report a change has taken place in the ownership of FIC itself. In 1979 its former holding company, Charringtons, was taken over by the Coalite Group, a substantial public company, based in Derbyshire, engaged principally in the manufacture, processing and distribution of a range of solid and liquid fuels and with interests also in vehicle building and engineering, automotive distribution and contract hire, transport, warehousing and shipping services. In the year ended 31 March 1982, the Coalite Group's profits before taxation amounted to £23·9 million. FIC is, therefore, now a very small part of a larger group, accounting in 1980 for less than 1 per cent of its parent company's pre-tax income and about 2 per cent of its turnover.

In 1976 the former owners of FIC had disposed of some of its UK subsidiary activities at a profit of £220,000, so that when Coalite took over, its non-farming subsidiaries consisted of the Falkland Islands Trading Company (which purchases and arranges the shipment of stores to the Falkland Islands and provides banking facilities in the Islands), Darwin Shipping Limited (which charters the vessel for the shipping service between the Falklands and the UK) and Southern Ship Stores Limited (ship chandlers in Southampton). Since the Coalite takeover the accounts of the FIC and its subsidiaries have not been consolidated as they were up to 1978.

As noted in Section 3.3.4 below, the FIC profits from farming have declined since 1976, like those from other companies. By contrast, income from their shipping and trading activities has grown, with net profit margins representing around 15-22 per cent on turnover.

3.3.3. Other farming companies

With the exception of a few owner-occupiers, whose numbers have now been swelled by the Green Patch and Roy Cove small farmers, the 57 per cent of

Falklands farming which is not controlled by FIC is distributed among another 13 or so companies, a high proportion of whose shareholders are not resident in the Falklands. Over the years the shareholdings in many of these companies have become fragmented, and an increasing proportion are vested in trustees. In at least one case trustees are in control of the company.

The companies have appointed managers to run their farms and, in most cases, the directors try to keep in touch with the situation in the Falklands. A typical arrangement is that one director from the UK visits the farm each year and reports back to the board.

Of the relatively few companies that are registered in the Falklands, several also tend to have shareholders who are resident abroad, and their policies have been very similar to those of the externally-registered companies.

3.3.4. Company performance

It was not possible for this updating to gather as much detail about company performance as was obtained for the 1976 Report. However, a number of companies registered in the UK, including FIC, assisted by furnishing information, and other information was obtained from the Companies Registry. This information was sufficient to allow an assessment to be made of how the companies have fared since the mid-1970s. The six companies for which information of various kinds was obtained represent about 64 per cent of the entire farming industry in the Falklands.

Their aggregate results show that trading profits have declined markedly, 1980 trading profits (£177,000) being only one quarter of those attained in 1976 (£686,000). Admittedly, 1976 was a particularly good year and 1980 a particularly bad one, but the decline in between was progressive. In real terms, of course, the fall has been even more marked. One of the companies performed extremely badly, incurring trading losses in five out of the six years. On the other hand, the companies' aggregate income from investments and interest has progressively increased from £45,000 in 1975 to £196,000 in 1980, when it exceeded trading profits. This indicates the extent of their reinvestment of funds outside the Islands.

The 1976 Report commented on the high proportion of post-tax profits distributed by the Falkland Islands Company. FIC in the 1960s was distributing by way of dividend about 80 per cent, and in the early 1970s up to 96 per cent, of its profits after tax. The other companies surveyed in the 1976 Report pursued, on the whole, a more conservative policy, distributing on average just under 60 per cent of post-tax profits.

In the period 1975-1980, the distribution by way of dividends made by the six companies, including FIC, averaged 64 per cent of profits after tax, with little variation between FIC and the others. The implications of this policy for the economy of the Islands is examined further in the following sections 3.3.5 and 3.4.

3.3.5. Investment

Historical situation

The 1976 Report found that there had historically been a general reluctance by the farming companies to invest in the Falklands more than was needed to

maintain existing assets. In consequence, agricultural output has remained more or less static with no new stimulus being provided for future growth and development. The problem had not been lack of available funds but rather the investment policy of the farming companies. The 1976 Report (Vol. 1, pp 52-54) discussed the factors contributing to this state of affairs:

- The lack of obvious investment opportunities with good prospects of a satisfactory return, particularly in agriculture. However, the companies themselves did not seem actively to seek out new local opportunities.
- The uncertainty of the political situation in the recent past. But this does not explain the traditional reluctance of companies to invest their surplus funds in the Falklands.
- Better investment opportunities elsewhere. Higher, and possibly more reliable, returns could be obtained in the short term by investing in UK Securities.
- The shareholding structure and control of the companies. This has not been conducive to the development of bold, innovative investment policies in the Falklands because the directors wished to secure a regular income for their (substantially absentee) owners. Also, the local shareholders and directors, a relatively small group from the farm-owning families in the Islands, tended to be conservative and cling to the traditional methods of their companies, while the more likely sources of fresh ideas, the farm managers, were insufficiently involved in company decision-making.

Period since 1976

The available evidence indicates that the investment policies of the companies have, admittedly in a period of low profits, worsened since 1976. An examination of the accounts of the six companies (including FIC) from whom information was obtained, reveals that new investment has hardly kept pace with the depreciation of existing fixed assets. As a result, the net book value of their aggregate fixed assets has been reduced from £3·811 million in 1975 to £3·722 million in 1980.

FIC has in fact a somewhat better recent investment record than the other five companies examined, and has made good the depreciation of its assets by reinvestment. On many farms, however, capital assets have been allowed to deteriorate and maintenance has not been carried out. Very approximately, total private investment over the 1976-81 period is estimated to be of the order of £0·8 million.

One possibly encouraging sign is that the companies seem to have responded positively to the investment incentives offered by the Government in the new capital expenditure depreciation allowance provisions introduced on 1 January 1979, which brings allowances into line with those in the UK.*

The future

Nevertheless, it is unlikely that the more generous depreciation allowances will by themselves transform the pattern of investment in the Falklands because

*However, the fencing subsidies which have been available for many years have only been taken up to a limited extent.

many of the inhibiting factors referred to earlier still prevail. The political uncertainty may to a great degree have been removed but the constraining structure of farm ownership remains largely unchanged, and we believe this situation must be tackled before significant changes in investment policies are likely to occur. In this context it would be very useful to have some information on the pattern of investment by the new owners of the sub-divided Green Patch Farm. It is said that money has been spent on improving buildings and equipment, but unfortunately no reliable data are at present available.

New company investment

The Government has, of course, used other methods of encouraging investment, notably by making subsidies available in respect of certain types of capital expenditure incurred by business enterprises in the Falklands.

The Government has sought to encourage the establishment of new business enterprises by introducing tax legislation in 1980 in connection with "pioneer enterprises". Any enterprise so declared by the Governor in Council is entitled to exemption from tax in respect of the profits derived from the specified trade or business for the first five years. The declaration of a pioneer enterprise may be extended by the Governor in Council for a further period not exceeding three years, in which case the extent of tax-exemption is at the discretion of the Governor in Council. This ability to grant "tax holidays" to new enterprises gives the Government a valuable and flexible means of attracting new investment into the Falklands. We believe that the potential for an eight-year tax holiday should be sufficient instrument for encouraging new investment. Further discretionary powers for extending this period could always be introduced if, nearer the end of the eight-year period, a sufficiently strong case could be made by the investor.

3.4. Flow of funds between the Falklands and the UK

3.4.1. Historical situation to 1974

One of the major findings of the 1976 Report was that there had been a continual outflow of funds over the years from the Falkland Islands to the UK, largely in the form of company dividends and undistributed profits which were not reinvested locally. An examination of the relevant figures for the period 1951 to 1973 revealed that these outflows had considerably exceeded inflows made up of UK aid and FIG income from their UK investments. It was pointed out that the UK Exchequer had gained substantial amounts from taxes on the outflow of funds and it was estimated that, for the 1951-73 period the UK direct tax take (about £1·9 million) on dividends and profits from this flow of funds was approximately twice the amount given as UK aid to the Falklands (£0·9 million).

The 1976 Report considered this drain of resources from the Falklands was the major cause of the decline in the economy and population of the Islands.

3.4.2. 1974-80 period

Since 1976 the balance between the flow of funds out of and into the Falklands has changed markedly. In every year since 1974 the inflow of funds has considerably exceeded outflows—see Table 3.4(a), for the following reasons:

- UK aid to the Falklands has been stepped up and has been running at an average of £1·3 million per annum;
- FIG revenue from abroad, in the form of investment income and philatelic sales, has grown substantially;
- since 1976, which was a very good year, company profits have declined, and so have the funds available for distribution and investment abroad;
- the rates of company taxation in the Falklands have been increased, thus reducing (and from 1980 virtually eliminating) the differential which used to be payable to the UK Exchequer on the Falklands profits of the UK registered companies. The net gain to the UK Exchequer of funds leaving the Falklands is now largely confined to the taxes on the dividends and withholding taxes, which have themselves declined with the fall in remittances.

Table 3.4(a) gives rough estimates of Falkland Islands fund flows in 1974, 1977 and 1980; it will be seen that net investment and property income remitted abroad (outflow) has declined while Government investment and other income from abroad (inflow) has increased. In fact, in 1977 and 1980 these inflows exceeded outflows, a reversal of the 1974 position.

TABLE 3.4(a)

Estimated fund flows into and out of the Falklands (current prices £000s)

	1974	*1977*	*1980*	*Total 1976–80 Approx. £ millions*
Outflow				
Net investment and other income	480·4	183·0	52·0	1·1
Inflows				
FIG investment and other income from abroad	110·1	302·0	452·0	1·6
UK Aid (excluding OSAS salary supplements and training in UK)	1,676·8	959·0	839·0	5·8
	1,786·9	1,261·0	1,291·0	7·4

Sources: FIG estimates, ODA and Team estimates.

By far the most important element in the increase in UK aid was the construction of the permanent airfield, and more recently the Stanley/Darwin road. Part of the increased aid consists of Overseas Service Aid Scheme (OSAS) salary supplements paid in the UK, but the bulk of the expenditure is actually made in the Falklands. In addition to the aid expenditure, the Foreign and Commonwealth Office also contributes substantially to the cost of the Governor's office. In the five financial years 1976/77 to 1980/81 these contributions totalled £293,000, an average of £58,000 per annum.

3.5. Government finances

3.5.1. Recurrent revenue and expenditure

The 1976 Report found that traditionally, in terms of recurrent revenues and expenditures, the Falkland Islands Government has been self-supporting, managing over the years to balance its budget from its own resources. The Report pointed out, however, that in the recent past Government revenues and expenditures had been quite finely balanced, expenditure at current prices having increased from year to year while revenue tended to fluctuate as the market price of wool affected farm profits. It then expressed the view that FIG was likely to experience difficulty in balancing its budget in future years, except in those years when Government tax revenues benefitted from healthy farm profits.

However, in the years since 1976, FIG has in fact continued to manage its finances very ably, as shown in Table 3.5(a). A more detailed breakdown is given in Appendix Three.

TABLE 3.5(a)

FIG recurrent revenue, expenditure and surplus/deficit (£000s current prices)

Fiscal year 1 July–30 June	*Recurrent revenue*	*Recurrent expenditure*	*Surplus/ (deficit)*
1972/73 Actual	466	525	(59)
1973/74 Actual	717	601	116
1974/75 Actual	944	876	68
1975/76 Actual	1,330	1,006	324
1976/77 Actual	1,154	1,131	23
1977/78 Revised estimate	1,603	1,417[c]	186
1978/79 Actual	1,857	1,680	177
1979/80 Actual	2,428	1,922[a]	506
1980/81 Revised estimate	2,298	2,476[b]	(178)
1981/82 Estimate	2,478	2,411[d]	67

[a] Before transfer of £490,000 to Development Fund.
[b] Before transfer of £136,000 to Oil Stocks Replacement Fund.
[c] Before transfer of £300,000 to Development Fund.
[d] Before transfer of £25,000 to Development Fund.

Source: FIG estimates.

Table 3.5(a) shows that FIG has pursued a successful conservative policy, achieving a surplus of recurrent revenue over recurrent expenditure in every fiscal year except one (1980/81) since 1973/74. In the ten years (1972/73 to 1981/82 the cumulative net surplus, before transfer to funds, amounted to £1·230 million. This compares with the cumulative net surplus amount of £0·120 million in the ten years 1965/66 to 1974/75, in which deficits were incurred in four of the years. FIG has been achieving improved surpluses even though recurrent expenditure at current prices has increased fourfold in the period 1973/74 to 1981/82.* The surpluses have therefore been gained not by reducing expenditure but by ensuring that the growth in overall revenue has more than compensated for the increase in expenditure.

*At constant prices, using the Stanley Retail Price Index as a deflator, the increase was only 43 per cent.

Total expenditure in 1981/82 was around £2·4 million, of which the most significant items are Public Works Department (25 per cent), aviation services (12 per cent), education (11 per cent) and the medical services (12 per cent).

Expenditure

The most dramatic increase has been in the Public Works Department, the net cost of which (after offsetting revenue from municipal services) has risen to more than 500 per cent of the 1973/74 level. Apart from the impact of inflation, this represents the cost of policy in recent years of staffing and equipping the PWD properly to enable it to carry out its wide range of services more effectively.

Aviation, whose costs have also jumped dramatically, now includes a provision for aircraft replacement, and also reflects the addition of a Britten-Norman "Islander" to the fleet of two "Beaver" aircraft. Escalating costs have pushed the Government subsidy element up to 65 per cent.

At the time of the 1976 Report, the single most costly service provided by FIG was education, whose costs have more than tripled since 1973/74. However the cost of medical services has risen even faster, almost quadrupling in the same period. One of the major medical expenses is the cost of medical treatment overseas which runs at 20-25 per cent of total medical costs.

Revenue

Since 1976 FIG has taken numerous steps to ensure that its recurrent revenues have kept ahead of its rapidly escalating recurrent expenditures. Virtually all of the recommendations for improving revenues contained in the 1976 Report have been implemented with some resultant shifts in the pattern of Government income.

Internal revenue, which is drawn mainly from the taxation of companies and individuals, has naturally remained the main source of FIG income, but there has been a significant change in the relative importance of the two major constituent items. Revenue from company taxation has traditionally been more important, even though it fluctuated as wool prices affected company profits.

Since 1976 the pattern has continued to be erratic with a particularly bad year in 1976/77 (£96,000) and a good year in 1979/80 (£696,000). The trend, however, in view of company financial performance has not surprisingly been downwards.

Revenue from personal taxation, in spite of a fall in the population, has displayed a firm upward trend, yielding more than the revenue from companies in 1976/77 and 1978/79. In 1980/81 both contributed equally about 17 per cent to total revenue, but the future trend is one of relative decline from company taxation.

The rising trend in FIG revenue from personal taxation has been partly due to increases in wages and salaries and partly the result of the upward revision of tax rates. The tax rates applied to companies was increased from 40 per cent to 52 per cent by 1980 (with a lower rate of 42 per cent applying to assessable profits up to £60,000). Much more generous capital allowances were introduced in 1979, bringing them more or less into line with the allowances prevailing in the United Kingdom.

Several sources of FIG revenue have shown encouraging growth in recent years, including Customs duties and harbour facilities. However, the most

notable increase has been earned by the Posts and Telecommunications Department, contributing 23 per cent of Government income by 1981/82. The estimated revenue for 1982/83 is attributable very largely to philatelic revenue, the increasing revenue from philatelic sales being achieved through more aggressive marketing methods through the Crown Agents and, latterly, by establishing a Philatelic Bureau in Stanley. Naturally income fluctuates according to the number and timing of special issues.

3.5.2 Future outlook

Fiscal revenue

Having implemented all the fiscal recommendations made in the 1976 Report, FIG now has only limited scope for improving revenues from direct and indirect taxation and other charges. The rates of personal and company taxation are currently more or less in line with those prevailing in the UK, and further increases would hardly seem justified. Other charges, including the Medical Services Levy contributing around £65,000 in 1981/82, have been raised in real terms as far as it is reasonable to expect they can be.

The Pepper Report* of 1977 made the suggestion that, in view of the fact that most assets in the Falklands are owned by companies based outside and it is therefore only the assets of "kelpers" who live and die in the Islands that are subject to estate duty, the latter should be abolished and replaced by a "land tax" levied annually on property. While this idea has some merit on grounds of equity, it would impose further tax burdens on companies that are currently contending with depressed wool prices and rapidly rising costs. For the same reason, Mr Pepper's wool export levy does not seem practicable at present.

Income from stamps and coins

While the means of boosting fiscal revenue seem limited, the prospects for philatelic revenue are extremely good. FIG revenue from this source in 1981-82 was apparently in the region of £600,000. Now that the Falklands have been put very firmly on the world map, interest in their stamps should be stimulated, and the likelihood is that forthcoming commemorative issues will be very successful. Issues of commemorative coins should benefit in the same way, and it would therefore not be unreasonable to expect that FIG revenue from philately and seigniorage will soon be in the region of £1 million a year and possibly more. It is worth noting that the philatelic income of the Dependencies (in respect of which FIG only receives a handling charge) is also large—in the region of £0·5 million a year at present.

Effect of creation of small farms

The farm sub-division schemes are likely to have an adverse effect on Government tax revenue in the short to medium term. Some, if not most, of the new owners or tenants (depending on the individual scheme) of the smaller farm units will be former employees of the larger farms. Such a shift from employed to self-employed status has the effect of increasing tax discretion so that the total

**Interim Report on a Fiscal Survey*, FIG, August 1977.

amount of tax paid is less. Also if, as anticipated, reinvestment through plough-back of profits is higher in the new smaller units, the capital allowances which are now quite generous will tend to reduce the Government's tax-take further in the short term. In the longer term, however, the higher level of investment should produce higher profits which will ultimately enhance Government revenue.

Expenditure

Expenditure on recurrent items can be expected to be affected by the aftermath of the war. The cost of rehabilitation itself will be large compared to recurrent expenditure, although a special UK Government Fund is expected to cover most items. Indeed one would expect both the Government and the private sector to gain from the rehabilitation fund, as repair work from the war damage will undoubtedly, in some situations, have been necessary anyway.

3.6. Development expenditure

3.6.1. The 1976 Report contrasted the self-sufficiency of the Falkland Islands in terms of recurrent revenue and expenditure with their considerable dependence on UK aid for funds to meet their development expenditure needs. Table 3.6(a) shows that in the ensuing six years, 1976-81 inclusive, a total amount of approximately £9·2 million was spent on development in the Falklands, an average of £1·5 million a year as compared with an average of £213,800 a year in the preceding ten years. Thus, since the 1976 Report, and even allowing for inflation, development expenditure has grown substantially.

TABLE 3.6(a)

Development expenditure in the Falkland Islands *1976-1981* (£000s)

	1976	*1977*	*1978*	*1979*	*1980*	*1981*	*Total*
UK capital aid:							
Grants and loans	1,233	758	1,766	442	587	339	5,125
Technical co-operation	261	357	355	473	427	719	2,592
Total UK aid	1,494	1,115	2,121	915	1,014	1,058	7,717
Expenditure for development voted from Colony Funds	51	94	130	146	548	532	1,501

Sources: ODA, and FIG estimates.

3.6.2. The bulk of this increase has been funded by UK aid in various forms. It can be seen in Table 3.6(a) that UK aid in the period 1976 to 1981 totalled £7·7 million, an average of £1·3 million a year. The capital aid has funded a number of projects, the largest of these being the construction of the permanent airfield. Other major projects included the new "Islander" aircraft and hangar, telecommunications, the school hostel and the start of the construction of the Stanley to Darwin/Goose Green road (budgeted at £1·2 million).

Under the technical co-operation programme, approximately 38 people at any one time, who are working for FIG, have their salaries supplemented out of the Overseas Service Aid Scheme (OSAS). United Kingdom aid also funds six long-term technical co-operation officers working in the Falklands as members of the Grasslands Trials Unit. In addition, numerous short visits by technical co-operation officers have been arranged by the Overseas Development Administration and paid for by the United Kingdom. Finally, at least six Falkland Islanders have been trained in the UK in any one year under the aid schemes.

3.6.3. Only since 1979 has the FIG allocated significant amounts of its own funds to development projects. Over the 1976/81 period approximately £1·5 million was set aside, the largest item probably being the subsidies to the Green Patch Farm sub-division scheme and house purchases. We note that in 1980/81 it voted £25,000 towards a tourist development which collapsed partly due to under-financing as well as poor promotion.

3.6.4. The development expenditure required if the Islanders are to have a future will far outweigh the funds able to be internally generated. Nevertheless, it will also, as discussed in Section 2.13 of the Conclusions, be necessary to expand the Government machine in certain significant respects. A Development Officer has already been appointed and we are also recommending the creation of the post of Chief Executive. Reference has also been made to the need to expand the Agricultural Office. These three appointments alone, if they are not financed under technical cooperation, would increase Government expenditure by around £80,000-100,000 a year, after housing is taken into account.

3.7. Banking and finance

3.7.1. There has been no significant change in the banking facilities available in the Falkland Islands since 1976. It was noted at that time that certain rather limited banking services were provided by the following bodies:

(a) Falkland Islands Trading Company (FITC)

This company, which is owned by the Falkland Islands Company, acts as banker for FIC's employees and also to many of the other farming companies, partnerships and individuals. Customers can draw cheques on their account with FITC which, through a correspondent bank in the UK, provides a remittance service. The main banking business of the company, in terms of volume, is the provision of overdraft facilities to non-FIC farms pending the sale of wool over which a lien is held.

(b) Falkland Islands Government

FIG provides some banking services through the Treasury on the one hand and the Savings Bank on the other.

The Treasury provides a remittance service by means of sterling drafts or cable transfers effected through the Crown Agents. It also cashes cheques and provides foreign exchange facilities.

The Government Savings Bank accepts deposits (maximum £35,000 a person) on which it currently pays interest of 5 per cent tax free. Customers can withdraw cash and have payments made to third parties. The Savings Bank had deposits totalling £2·4 million at the end of February 1980 when Mr R. A. V. Benbow carried out a survey of banking facilities.*

FIG has also made loans for house purchase at favourable rates of interest and loans for other purposes such as improvements to property, extension of tourist facilities, etc. Most recently, FIG has arranged loans from the Savings Bank to the purchasers of the Green Patch smaller farm units.

(c) Stanley Cooperative Society

The Society maintains small interest-bearing deposit accounts on behalf of its members. The interest in early 1980 was 7 per cent with a maximum holding of £1,600 a member, of which there were about 300.

3.7.2. There is a need in the Falklands for proper commercial banking facilities. In particular, there is a need for overdraft and loan facilities to be made generally available on a commercial basis, particularly for business purposes if development is to be encouraged. Sound independent, professional financial advice is also generally lacking in the Falklands, and an experienced bank manager would be able to provide this missing ingredient. A commercial bank could act as a much-needed catalyst in the economic development of the Islands.

Discussons are currently taking place between FIG, the FCO and a prominent international bank which is seriously interested in establishing a branch in Stanley to provide services for Falkland Islanders, the companies, Government and the military garrison. We welcome this interest and it is to be hoped that these discussions will be successfully concluded.

3.7.3. It is worth noting in this section the opinion we expressed in the 1976 Report that the Falkland Islands should not seek to become a tax haven.

3.8 South Georgia

Although South Georgia was formerly the base for a substantial industry, at present no economic activity takes place there. There are possibilities, which should be explored, of once again exploiting in due course the marine resources in the adjacent areas of the Southern Ocean.

* *Banking Facilities in the Falkland Islands*, R.A.V. Benbow, ODA, March 1980.

SECTION FOUR

THE POPULATION, SOCIAL ASPECTS AND IMMIGRATION

4.1. Population

4.1.1. The population of the Falkland Islands has continued to decline, and at the 1980 Census stood at 1,849 (if allowance is made for 36 Royal Marines included in the previous Census). This compares with a figure of 1,957 in 1972. The rate of decline has changed little since 1962 (see graph).

The population of Stanley has remained remarkably stable in the past 20 years (1,086 in 1980, 1,074 in 1962).

Decline has been most marked in the Camp, with a loss of 11 per cent since 1972 in East Falkland and 15 per cent in West Falkland. The age and sex structure of Camp settlements remains abnormal, with relatively few women or old people. The dearth of young women is becoming still more acute. In East Falkland between 1972 and 1980 there was a fall of 27 per cent in the number of females aged 15-30. In West Falkland there was some improvement in the total in this age group, but at the last count there were only two unmarried women aged 20 or over (four in East Falkland excluding Stanley).

Comparative figures on out-migration are difficult to obtain owing to inconsistencies in the data, but it seems clear that people have continued to leave the Islands at a disturbing rate (probably at least 1·5 per cent a year). It is likely that a high proportion are young women, as noted in our 1976 Report. The number of births was recently (in 1979) exceeded by deaths for the first time since records started at the turn of the century.

The indigenous "kelpers" (those born in the Falklands) have continued to decline in numbers and in 1980 represented about 75 per cent of the population.

In 1980, 95 per cent of the population was British.

4.2. Social aspects

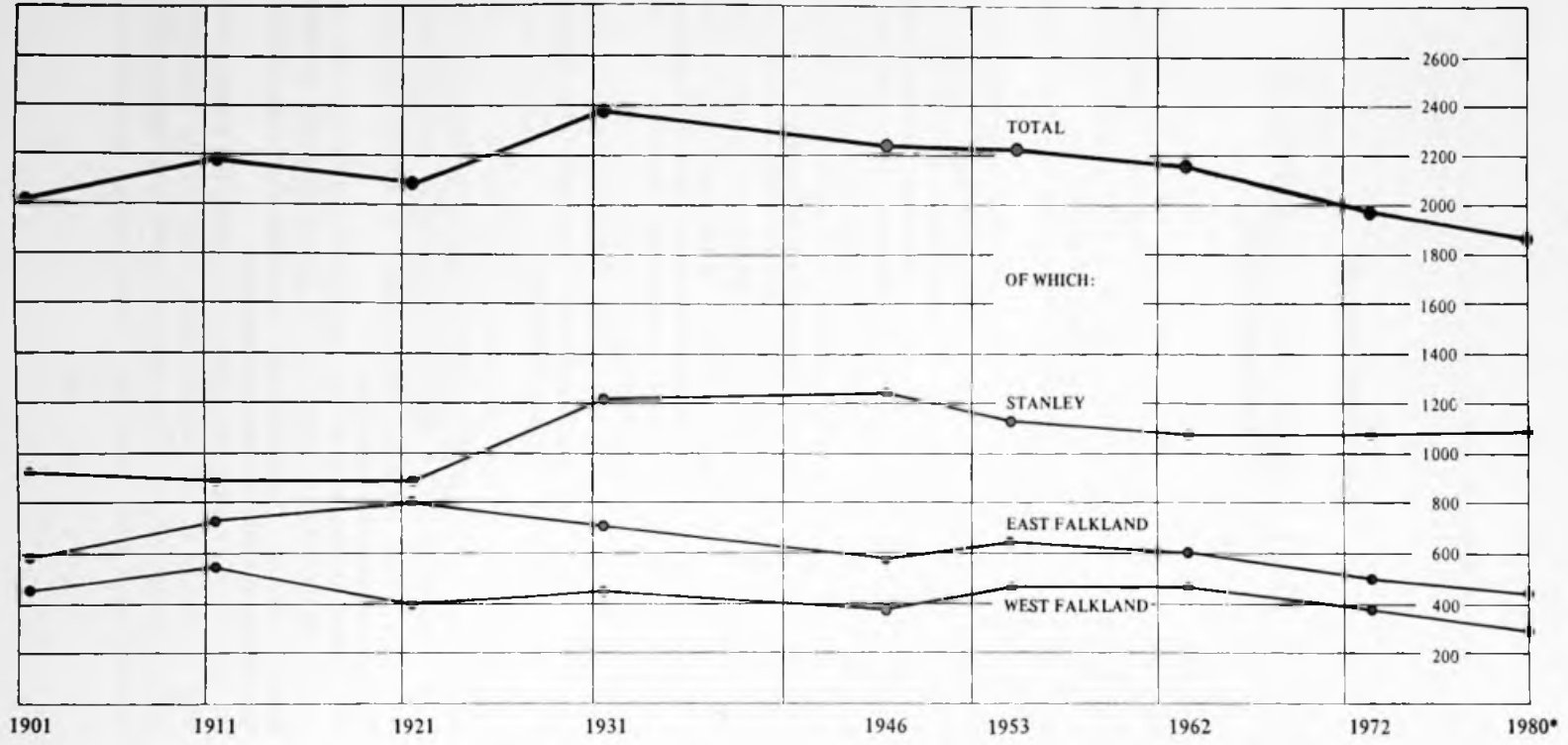
4.2.1. The 1976 Report* referred under this heading to features of life and society which we believed would affect the likelihood of development and/or the quality of life. These features, which cannot be wholly separated from economic factors, included the following:

(a) the marked dependence of the indigenous population, e.g. on companies, owners and managers, on the government and on Britain. In spite of qualities of resilience and versatility, there was acceptance of this dependence which inhibited enterprise;

(b) the lack of opportunity for people, particularly the young, who might wish to acquire an independent stake in the Islands, especially in the land, or obtain jobs away from the traditional farm labour pattern;

*Vol. 1, Chapter 5.

FIG 4.1 POPULATION OF THE FALKLAND ISLANDS



Source: Team

*allowing for small military detachment included in 1972

(c) the rather fragmented nature of Falkland society and the lack of a sufficiently distinctive local culture (as opposed to a sense of Britishness) to foster self-confidence;

(d) the deficiencies, as opposed to the undoubted attractions, of Camp life. These included the effects of isolation—particularly for women and the young; the extraordinarily imbalanced age and sex structure; and the tied-house system;

(e) the need for improved social infrastructure in both the Camp and Stanley, for example, in medical services, recreation, care of the elderly, and other areas of welfare provision.

4.2.2. Our earlier report made numerous recommendations with a view to meeting such points, which remain as valid as in 1976. Some have been implemented or are in hand, but progress overall has been too slow, to judge by the most telling indicator of all—the continued outmigration of young people.

4.2.3. In social terms, the situation now facing the Islanders carries opportunities, but also high risks. Without visiting the Islands and talking to people as we did in 1976, we can do little more than speculate as to their attitudes and expectations, which will of course have changed, and will continue to change, as a result of recent events. For most we think there will be an initial readiness to stay, even on the part of many of those who previously intended to leave. All kinds of improvement may now be thought possible, given the evident will of the British Government. Social and economic changes previously slow in coming—especially those which would give Islanders a greater stake and say in their own affairs—may now appear likely. The costs of change will seem acceptable against the benefits. It is already being said that "life will never be the same again anyway", with the implication that any level of development would therefore be acceptable. At the same time, there will undoubtedly be those who find such change unacceptable, and there are reports that, in the aftermath of the war, there is a certain amount of discontent among the Islanders about their circumstances, at least in Stanley, reflecting new strains on social cohesion.

Change is certainly necessary. Chief among the means to bring about necessary social (and in the longer term economic) advances is the creation of more small-holdings and other niches, for example, in supplying and servicing an increased population, as well as improvement of the social infrastructure, including communications. Some immigration will be necessary if labour and skills are to be found for new projects. But experience elsewhere suggests there must be some thought given as to limits on the scale and nature of development. The need for this is to be seen in Scottish Highland and Island communities, for example, those involved in oil-related activities; and the Falklands may be said to be more socially fragile than these Scottish settlements.

4.2.4. The garrison will of course be a fact of life in the Falklands although, as discussed in Section 5, its impact will be considerable. Beyond this impact

the scale of development becomes critical. Some of the costs of large-scale projects as experienced in other rural situations include:

- local price and wage inflation;
- adverse effect on indigenous industry, for example, through diversion of labour;
- strain on social services;
- threat to local life-style and social structure; and
- on cessation of projects, unemployment and run-down of associated activities. Such effects can be seen quite early, for example at the end of any construction phase.

Of course not all projects carry these costs. Large-scale development is a relative concept (though with a local population of only 1,800 this is not a comforting thought). Probably only the garrison and, of the projects publicly referred to so far, the rather remote possibility of a large oil-related development or deep-sea fisheries base requiring several thousand immigrants, offer major social risks. The others suggested, for example, inshore fishing, salmon ranching, textiles and alginates, could be classed as more evolutionary than revolutionary in effect. Of course, if all were promoted together without careful planning there could be adverse impact, but various constraints are likely to prevent this in any event. What has to be avoided is either of the two poles on the range of possible development—so little that certain necessary changes do not take place, or so much that valued features of life in the Falklands disappear altogether.

4.2.5. Participation

The social and economic changes facing the Falklands will heighten the need for fuller participation by the Islanders in the running of local affairs. We suggest there is a case for re-examining our 1976 recommendation for community councils. Certainly it seems arguable that there should be restoration of the Town Council in Stanley, whose people will bear the main impact of new developments, including the garrison. The structure of the FI Councils may also justify examination, for example to establish how far the nomination of some members by the Civil Commissioner, that is, without election, remains appropriate. (Change here need not preclude co-option of people without voting powers.)

4.3. Immigration

4.3.1. In view of the shortage of labour, it is clear that development on any substantial scale will require immigration. There may well be a good deal of interest in this in the UK—over 500 letters resulted from an advertisement which appeared before the Argentinian invasion, and there have been more enquiries since.

4.3.2. Experience elsewhere suggests a need for very careful processing of immigrants. Of course the Falklands may well appeal to not a few persons of

ability and enterprise who welcome a challenge, and would do well in the Islands. However, it has also to be said that a large proportion of would-be settlers in remote island locations tend to be unsuitable, often cherishing a romantic and unrealistic view or seeking escape from problems which in the event they bring with them. On the collapse of their island idyll they may become charges on local social services, as some offshore communities of Britain have discovered. The consequences of such failure 8,000 miles from home would of course be acute. Moreover those who prove to be skilled and physically capable of life in the Islands need more than practical competence. They must be suited in personality terms, if friction with the indigenous population is to be avoided. With a large garrison on their doorsteps, the Islanders are likely to feel somewhat beleaguered and would not respond well to the attitudes sometimes displayed by incomers in comparable UK situations.

4.3.3. Selection procedures must therefore be rigorous and of course carried out in the country of origin. Technical qualifications would have to be vetted by the companies or entrepreneurs concerned, but few will have the necessary experience of selection for island conditions (for example as developed by the Falkland Islands Company). A point to note is that where married immigrants are concerned, spouses should understand what they are going to. There could well be a role for screening by the kind of UK representation of FIDA recommended in Section 2.9.

4.3.4. Adequate housing will obviously be crucial to the success of immigration on any scale, and arrangements will have to be made for its provision in advance.

4.4. Labour Supply

4.4.1. Limiting factors on labour supply are of course the sheer smallness of the population and the distance from alternative sources. There are virtually no unemployed persons in the Falklands. We concluded in 1976 that in view of the trend to contract work in the Camp, and the near-completion of the airport extension, the situation was not as critical as might have been expected. However, the labour supply/demand situation is finely balanced. Clearly the range of developments which may now become possible, given greater security, cannot depend on finding local labour, apart perhaps from some of the married women at present unemployed (approximately 200 in Stanley and 140 in the Camp in 1980).

4.4.2. With new development competition for labour could be intense, especially during the construction period.

4.5. South Georgia

The only population on South Georgia are staff of the British Antartic Survey.

SECTION FIVE

IMPACT OF THE GARRISON

5.1. Introduction

5.1.1. The impact of a garrison will be influenced by a number of factors, the more important being its size and composition relative to the Islands' population, both locally and generally, its distribution, the time over which it will be maintained and the nature of its internal and external communications.

5.1.2. While the size and distribution of the garrison are still undecided, its likely impact is considered on the basis of our assumptions, as follows:

(a) the garrison might be up to 4,000 personnel;

(b) the garrison will be accompanied initially by a civilian labour force in the range 200 to 400;

(c) more than half the garrison will be based at, or close to, Stanley;

(d) the remainder will be divided between two or three locations one at least of which will be in West Falkland.

5.1.3. The impacts are discussed below in relation to local economy, to social infrastructure and to social effects.

5.2. Impact on the local economy

5.2.1. The garrison will have some impact on the economy through the use of some of the major infrastructure such as roads, jetty, moorings and airstrips provided primarily for military use. However, apart from the airport this infrastructural impact is likely to be relatively limited. The airport is discussed elsewhere in Section 12.1.3. Road building is likely to be largely confined to connecting key military installations.

5.2.2. Services to the garrison

The garrison will require civilian labour, in addition to that imported from the UK. While it is important that Islanders should be given the opportunity to obtain employment, it must be realised that an over supply of relatively well-paid jobs could have serious consequences, particularly for agriculture. The labour force in the camp must be maintained at an adequate level yet would appear most vulnerable to new job attraction, particularly in any outlying unit of the garrison. This question of the scale of new job opportunities is difficult and will require sensitive, sympathetic handling. Another adverse consequence of too many new civilian jobs would be the adjustment, perhaps to what may be seen

as less interesting and well-paid occupations upon the future running down of the garrison or any part of it.

The garrison is likely greatly to increase total retail and to some extent transport expenditure throughout the Islands, to the benefit of existing suppliers, shops and other service activities, for example those providing weekend accommodation at places of tourist interest. Food and drink outlets will be required immediately and response could be rapid. Various new services may become commercially feasible—hairdressing, shoe repairing, laundry etc. The scale of increase will be conditioned by decisions on whether any of the garrison are to be accompanied and whether the NAAFI is to be accessible to Islanders. Experience in offshore oil industry labour camps suggests that *per capita* local spending, when all is provided by companies, can run to at least £2·50 to £3·00 weekly. Even allowing for the fact that retail spending opportunities are more limited in the Falklands, an influx of 2,500 people could put over £355,000 annually into local retail outlets, pubs and eating places.

In total, the creation of new retail/service jobs, even if these were to be minimised through appropriate action within the garrison, could amount to the equivalent of 10-15 jobs. In practice several of these jobs would be part-time, thereby being shared among more people. Without appropriate action, the upper limit could be considerably more.

5.2.3. Supplies for the garrison

Horticultural development to provide fresh vegetables for both garrison and Islanders, requires capital and will take time to establish and produce. In theory the provision of fresh meat and fish for the garrison are other opportunities. This is discussed elsewhere in Sections 6.4 and 2.3 of the report. Every opportunity should be taken of the garrison insofar as it provides a larger home market for locally produced goods and for certain service industries such as tourism.

5.3. Impact on social infrastructure

5.3.1. Medical services

It is assumed that the garrison will provide a full range of medical facilities and will be independent of those provided by FIG. There may be opportunities, however, for co-operation in nursing services and in the use of specialists should any be provided for military cases. Assuming that referral of specialist cases to Argentina will no longer be practicable, it appears inevitable that these will have to be carried to the UK unless arrangements can be made with another country in South America.

5.3.2. Housing

Should even small elements of the garrison be accompanied, it is essential that family housing be provided. Accommodation for unaccompanied personnel will be straightforward after the first few months. The location of all accommodation relative to island communities deserves careful planning, however, since there may be opportunities for essential military work on buildings, roads and utilities to benefit Islanders, perhaps through sharing or eventual transfer to civilian control.

5.3.3. Recreational facilities

Facilities in the Camp are restricted to halls of varying quality. In Stanley there are a number of halls, three bars and a spacious, fairly well-equipped town hall. The use of these facilities, barely adequate for Islanders, by the garrison would inevitably lead to over-use and friction between the two groups. This is particularly so in respect of public houses, bars and dance halls. It is thought essential therefore that recreational provision in the garrison be on a sufficient scale and of high quality. This applies equally to bars, indoor games and sports facilities, a meeting hall usable as a cinema and comfortable accommodation for quiet relaxation and reading. Outlying units should have similar provision at the appropriate scale. Some of these facilities may also be made available to Islanders from time to time. If located in proximity to local communities, they can constitute a continuing asset for the civilian population if and when the garrison is reduced in number.

5.4. Social impact

5.4.1. General

Even with the best of physical arrangements, a garrison can become a focus of local community tensions. The presence of a large body of men, not there from evident choice and with very different backgrounds and purposes, some of which may encroach on local interests, can be disruptive. When garrison personnel exceed the number of local inhabitants something of a psychological limit is passed. The feeling can occur on the part of the Islanders of being overwhelmed, and problems are compounded. Thus tension is unlikely to be avoided in the Falklands, but it can of course be reduced by the best possible physical dispositions and by a community-minded approach on the part of all personnel. Without great care, the effect could be overwhelming.

The Falklands had a garrison of some 2,000 men during part of the 1939-45 war, and Islanders living in neighbouring Stanley at the time say that there was not a great deal of difficulty as a result. However it has been pointed out to us that war-time discipline was extremely strict, and that Stanley had an appreciably larger population than at present. Attitudes and expectations have also changed. All the Islanders to whom we have spoken express the hope that troops now to be stationed in the Falklands will be "accompanied". It is recalled that the former Royal Marines unit of some 40 personnel resulted in the out-migration through marriage of many young women. Of course, even if wives and families are permitted, the majority of troops will be unaccompanied. Competition for the relatively few single girls in the Falklands (there were only 26 aged between 20 and 30 in 1980) will be intense, and this is likely to result in young Island males having to leave if they are to find wives.

5.4.2. Social impact of a relocated airport

In view of the limitations of the renovated runway at Stanley, described in Section 12.1.3, a completely new runway will need be built. Its location will depend on a number of factors including defence requirements, ground and approach suitability and accessibility from Stanley, and settlements in the Camp. If, in the event, it is not practicable to construct a new runway in close

proximity to the existing runway, a new airport will have to be built. Should that be so, a difficult locational choice will have to be made between a number of sites with the right characteristics between the north end of Lafonia and Stanley itself. There are advantages to local people in a location near Stanley where the major facilities of the Islands are concentrated. On the other hand, the strengthening of the settlements of Goose Green and Darwin, under the impetus of a new main airport, would allow a second centre to develop with consequent benefits to many residents of the Camp. The same effect would follow, on a smaller scale, should the airport be located anywhere on the line of the new road along the north side of Choiseul Sound.

On balance, it is thought that a site near Stanley would offer optimum benefits to the Islanders allowing the strengthening of the major local services and institutions. The decision is crucial however, and it is considered that means should be sought of consulting local opinion should a choice of locations be presented.

A major construction project at a new airport will require a substantial contractor employing several hundred men over a two to three-year period. To minimise conflict with the interests of residents and with local facilities, it is recommended that such a labour force could best be accommodated at a high standard in a suitable ship moored at, or near, the site. Experience in the Shetland Islands, where 700 men lived for two years in chartered liners, suggests that with first-class management this method of accommodation can be satisfactory.

5.5. Conclusions and recommendations

5.5.1. It is difficult to summarise the impact of the garrison and its associated labour on the Falkland Islanders. So much depends on the sensitivity with which various developments are undertaken and the effort made to explain them to residents. Clearly the impact will be substantial and unavoidable in many respects. The aim should be, wherever possible, to minimise adverse impacts on local people and to maximise any benefits which may accrue. It is strongly recommended that a special liaison unit be established responsible to both the military and civil commissioners in pursuit of that aim.

While we appreciate the high cost of moving and accommodating dependents, we are in no doubt that the relationship between the garrison and the Islanders would benefit from the relative stability afforded by both dependents and female personnel in the garrison itself. We strongly recommend that every effort be made to reduce the wide disparity which will exist between the numbers of male personnel and of unmarried Island women.

SECTION SIX

AGRICULTURE

6.1. Farming in the Falklands

6.1.1. The environment

The agricultural environment of the Falklands is harsh compared with the United Kingdom. The generally poor soil fertility, low soil temperature/light rainfall and the wind give rise to a short and not very strong growing season—see Fig. A1.1 in Appendix One. The low soil temperature and the acidity of the soil severely limit response to nitrogenous fertilisers, and in the context of the system of extensive wool production practised hitherto, their application would be uneconomic. This would also apply to the heavy dressings of lime required to reduce soil acidity. Much of the terrain is hilly (more so in West Falkland), with rocky outcrops on the higher ground. The vegetation (there are very few trees on the Islands) is generally poor, interspersed with better grazing areas in the valleys and along the coastal belts. The coastal belts and the small islands are usually the most productive areas—see Table A1.1 in Appendix One—largely due to the beneficial manuring by sea birds and penguins, and the greater abundance of tussac.* The superior performance of island farms clearly indicates the potential improvement which can be brought about through raising soil fertility (Table A1.9 in Appendix One).

Attempts at pasture improvement have been very limited, partly because of the absence of scientifically based information on optimum methods, but also because of the generally poor economic returns for such investment.

6.1.2. Farms

There are 41 farms in the Falklands. These are mostly large, ranging from about 5,000-400,000 acres with 1,000-100,000 shorn sheep (Appendix One, Table A1.2) and are better described as ranches. The 23 smallest farms own only 13·3 per cent of the sheep shorn, whereas the five largest farms own 43·7 per cent. Twenty-one farms, representing a high percentage of the total acreage, are company owned, with the majority of shareholders non-residents of the farms; indeed most of the shareholders live outside the Falkland Islands. The Falkland Islands Company, with seven farms, accounts for 43 per cent of total acreage.

On most farms, the capital stock has suffered seriously from a lack of reinvestment. General maintenance of farm buildings has been done on only limited scale on many settlements in recent years, and the shearing sheds are urgently in need of repair and modernisation. The renovation of jetties will be a major and costly undertaking on several farms. Farms are generally well equipped

**Poa flabellata.*

with vehicles, but a high proportion of machinery is old and in need of replacement. Sheep handling facilities are poor both within the settlements and in the Camp.

6.1.3. Farming methods

Sheep management in the Falklands is conducted on a basis of minimum pastoral supervision, and given the conditions, there is no alternative. The policy of withdrawal of shepherds from Camp houses and some islands, while contributing to labour productivity, may prevent the adoption of improved grazing strategies involving regular movement of breeding sheep and maintenance of fencing.

A high proportion of the farms now use shearing gangs, which include both local and imported labour, to shear at least part of their flock.

There is considerable scope for training and improving the skills of the workforce in all aspects of crop and animal husbandry, as well as in the shearing, grading and handling of wool.

Most sheep in the Falklands are crossbred, containing an admixture of Merino and Romney blood, using mainly Polwarth and Corriedale types. These are well suited to the environment of the Islands and chiefly produce good quality wool in the 22-30 microns range (Appendix One, Table A1.3). The adoption of established selection programmes, using objective measurement of fleece quality and yield should reduce the current variation within flocks and thus increase the quantity of specific grades presented for sale.

6.1.4. Diversification

Beef, pork, milk, butter and vegetables are produced entirely for domestic consumption. In many respects the quantity produced falls well below the Islands' needs. Imports of canned and dried milk, dairy products and vegetables are quite substantial. However, since the time of the 1976 Report, milk production and the supply of pork and beef for Stanley has improved. Increased milk yield per cow had been achieved through heavy dependence on concentrates as the main source of energy during lactation. Commercial horticulture was almost non-existent, the only grower having recently moved from West Point to Stanley.

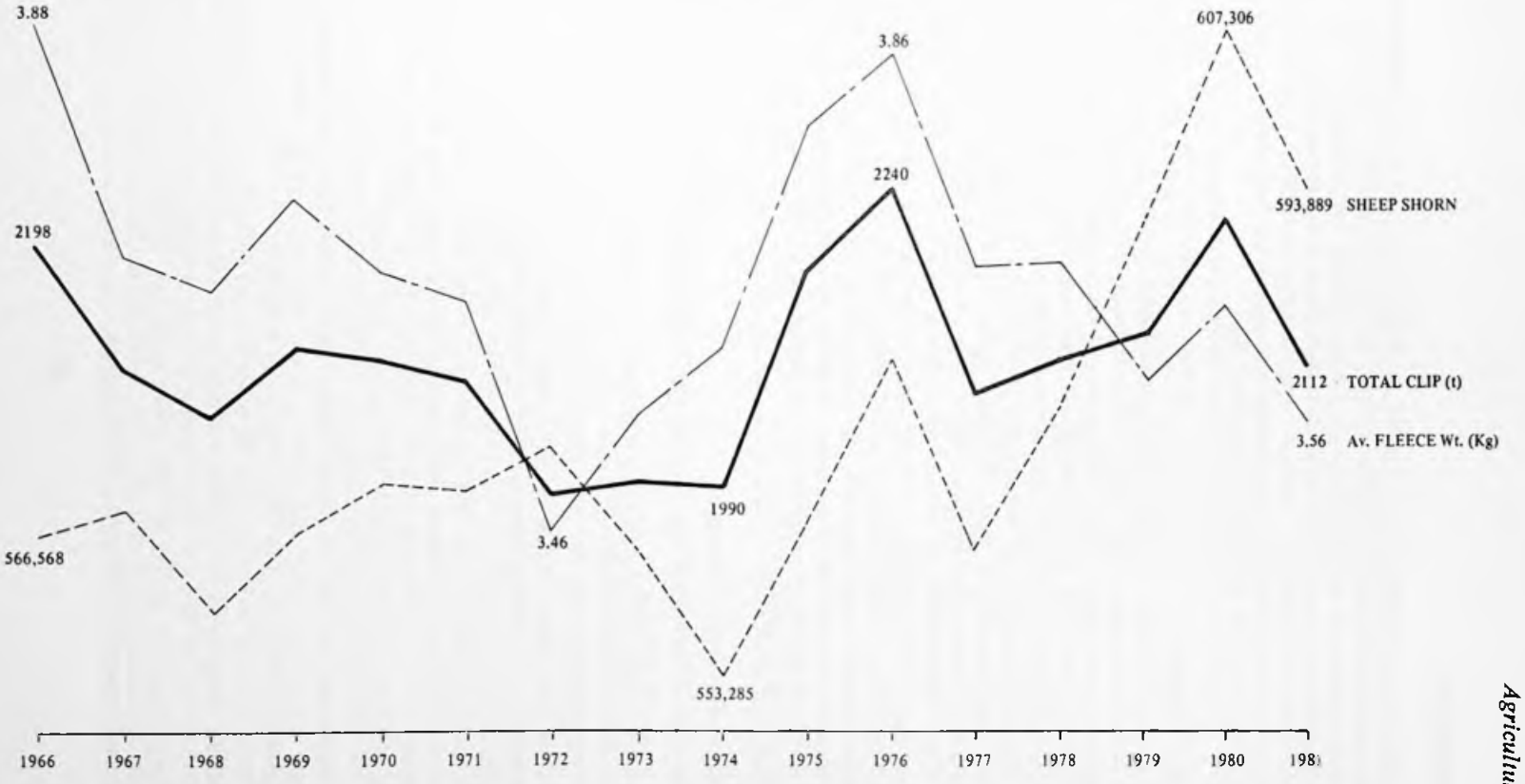
In recent years, the sale of skins has been the only export product besides wool. The subject of increased mutton production and exports is dealt with later in Section 6.4.2.

6.2. Performance

6.2.1. Stocking and wool production

As Figure 6.1 shows, the performance of Falkland Islands agriculture, or more precisely wool producers, has fluctuated over the years. Improvements in the total clip achieved in the period 1971-76 have not been sustained, and have in fact deteriorated. The flock size has remained in the 612,000-663,000 range for the last 15 years (Table A1.5 in Appendix One). Detailed data relating to the structure of the flock and lamb production at marking are shown in Table A1.6 of that appendix.

FIG 6.1 WOOL PRODUCTION 1966-81



Source: Team

The data on performance shown in Tables A1.7-A1.12 of Appendix One clearly show that there are wide differences between regions and between farms within regions. It is difficult to be specific about the reasons for the overall deterioration, but a contribution has been flock management factors, and on most farms, an absence of pasture improvements since 1975. The improvements attained during 1966-75 on three leading farms has not been maintained throughout 1976-81 on all these farms (Table A1.12).

6.2.2. Labour

Since the 1976 Report there has been a reduction of 8·1 per cent in the number of farm employees, with West Falkland losing 16 per cent of its employees (Table A1.13). Most of the reduction has taken place on independent farms; in contrast the FIC has increased its workforce by 8.7 per cent. The overall trend has led to an improvement in wool output per employee (Table A1.14).

The increasing cost of wages/salaries in relation to wool prices during recent years has undoubtedly been the main reason for the shedding of labour. The shedding of labour has been facilitated by the availability of shearing gangs.

This improvement in labour productivity has had, and will have, an increasingly adverse impact on wool output. The effect is a lack of general maintenance within the settlements and of fences, and a lower level of flock management—several houses are now left empty. It is feared that improvement programmes could not be undertaken on some stations because of the low labour force. This situation could be to a considerable extent ameliorated by greater use of contract labour.

6.2.3. Financial performance

The overall financial performance of the Falkland Islands farms is a function of:

- output per acre,
- the wool price, and
- production costs.

From the earlier Figure 6.1 and from Table A1.15 in Appendix One, it can be seen that while the output over the 1966-81 period has shown no general improvement, wool prices have fluctuated enormously with a resultant effect on farm financial results. This point has already been made in the context of the economy of the Islands and company profitability—see Section 3.3. In the period 1970-73, the price of wool fluctuated by 247 per cent, and since 1976 the price of wool has fallen by 20 per cent in real terms.

The effect of the trend in wool prices (up only 15·4 per cent) since 1974, and the considerable increase in labour costs* (up 126 per cent), and materials/fuel costs (up 185 per cent), has led to a sharp fall in the margin between revenue and costs over the period. This is shown in Table 6.1.

In view of the prediction that the price of wool, even for the growing knitwear market, is expected only to keep abreast of the rise in costs due to inflation, the outlook for the financial performance of Falkland Islands farms is unlikely to change until an upturn in the world economy pushes up wool prices. The

*In fact a larger increase than the cost of living index.

continuation of very low margins will severely test the financial survival of many farms, although the variation in unit cost performance on three farms—see Table A1.16, Appendix One, would indicate that there is room for cost reduction on some farms. At the same time, we have already noted the longer-term impact of labour shedding.

TABLE 6.1.

Approximate Falkland farm costs and income 1974-81 (pence per kg/wool)

	1974	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*1981*
No. of farms	11	3	10	10	10	10	10	8
Costs								
Wages and salaries	26·9	22·7	31·2	36·1	40·2	46·0	50·8	60·9
Materials	9·3	12·3	15·6	22·9	19·9	23·9	28·9	26·5
Depreciation	5·7	7·1	6·7	7·3	8·0	6·7	8·0	11·2
Others	8·3	8·8	8·2	10·7	13·1	11·5	6·3	5·9
Total production costs	50·2	50·9	61·7	77·0	81·2	88·1	94·0	104·5
Sales costs	6·7	6·9	8·8	10·3	10·8	12·7	14·9	15·3
Total cost (1)	57·0	57·8	70·5	87·3	92·0	100·8	108·9	119·8
Income								
Gross wool sales (2)	107·3	55·2	94·6	118·4	115·8	124·7	114·4	123·8
Margin (2)-(1)	50·4	—2·6	24·1	31·1	23·8	23·9	5·5	4·0
Margin as percentage of gross wool sales	46·9	—4·8	25·6	26·3	20·6	19·2	4·8	3·3

6.3. Scope for improvement

6.3.1. Grasslands

Any long term improvement in the primary sector of the Islands' economy must come from additional wool yield per acre, which in turn must be based on increased nutritional benefit from the grasslands. At the moment the genetic potential of the sheep is not being realised in terms of fertility potential, lamb survival rate, and their development and growth. In the absence of other sources of feed, the improvement can only come from the establishment and maintenance of improved pasture, better pasture utilisation, and their integration with the natural swards. Undoubtedly investment in grasslands improvement with the proper guidance will result in some increases in yield. It is not possible to define the scope for improvement until more research has been carried out under the auspices of the Grasslands Trials Unit. Pasture utilisation is particularly important in an area of low soil fertility; the methods of improvement are not easy to implement.

There are certainly no obvious and quickly attainable routes to improvement of grasslands. Nor are the economic returns for the probable investment levels required likely to compare well with possible investment opportunities outside the Islands. However, an increase of 10 per cent in yield of wool at the average 1976-81 wool price of 120p/kg would represent an increase in gross income to the Islands of approximately £250,000 a year. We are concerned about the generally low interest in grasslands improvement among sheep owners—in one

case a farm manager's improvement scheme was resisted by the owner--even though this attitude may be understandable in view of the absence of a clear solution in sight and the current poor farming profitability.

6.4. Diversification of agriculture

6.4.1. The supply of foodstuffs to Stanley and the garrison

We have noted already that while improvement in milk and pig meat supply has occurred since 1976, there is considerable scope for further development of fresh foodstuff production. This opportunity has of course been greatly enhanced by the presence of a much larger permanent garrison but there is also the potential to provide a considerable amount of fresh produce, particularly vegetables, to visiting British Antarctic Survey ships and the Polish fishing fleet.

Livestock products

The possibility of increasing the supply of mutton for the needs of the garrison will in the short term be considerably constrained by the effects of the war. Depending on the extent of indiscriminate killing and the delay to this year's breeding season, restoration of flock size and structure will take two to three years. This will limit the number of sheep of suitable quality* that farmers will be prepared to release for slaughter. In all probability cattle and poultry will also have been reduced in number.

Nevertheless, in the short term, farms will probably meet the needs of the civilian population of Stanley. There may also be some opportunist selling, as an initial reaction to the new market, which would not be sustained.

The dairy farm uses land on the Common, and the occupation will have seriously disorganised production. Apart from destruction of fencing and pastures, and possibly accommodation (and in some, or all, livestock), the supply of concentrates will have been cut off. It will probably take at least two years to rehabilitate this unit and to reorganise the system of production. It will be necessary to import concentrates from the United Kingdom as soon as possible in order to ensure the early restoration of fresh milk to Stanley. Future expansion of the dairy unit will be very dependent on imported foodstuffs. The development of acid-tolerant forage and root crop production by the GTU would greatly help milk production and also other forms of food production suited to small farms and small-holdings.

Given the opportunity to develop the same choice as exists in the United Kingdom, Table A1.17 in Appendix One shows the requirements in terms of numbers of livestock and tonnage of imported feedstuffs they require to meet the needs of a population of 4,000.

Vegetables and roots

There has been little attempt to develop commercial vegetable production, despite the apparent demand from visiting ships.

Growing vegetables was encouraged during the last war and the Department of Agriculture brought into cultivation 74 acres in the Eliza Cove/Stanley Common area and, even with a garrison, there was evidence of food surpluses.

*Even before the war there were complaints about the quality of mutton supplied to Stanley.

Supply of lime and inorganic fertilisers and provision of shelters and windbreaks will be essential. Late frosts and sporadic snowstorms during the growing season will undoubtedly present hazards to this activity.

Requirement for diversified farms

The establishment of smallholdings in the Stanley area, and possibly along the Darwin road currently under construction, could provide the level of crop and animal husbandry and housing required to produce vegetable and livestock products, some of which will be heavily dependent on imported feedstuffs and materials. However, depending on the extent to which this diversification is integrated with sheep farming, the total output required could in fact be provided by two such small-holdings, assuming they were wholly devoted to this activity.

A discussion on the creation of small farm units is given in Section 6.5 below.

6.4.2. The export of mutton

The 1976 Report noted the unsuccessful attempt of a previous mutton freezing export project at Ajax Bay. A number of factors played their part, including the location. However, the fact is the structure of the flocks was and is appropriate for wool production. This and the flock management geared to wool production meant that insufficient animals could be readily made available to ensure success of the project. Emphasis on meat production would require an increase in the proportion of breeding ewes from the present level of 33 per cent to 60-70 per cent, and lamb output and survival would need to be doubled. This could only be contemplated following a vast improvement in the plane of nutrition at key stages in the production cycle of breeding stock and at critical stages in the growth and development of young fatstock.

Nevertheless, the fact that 21,000 or so sheep are each year culled and discarded raises the question as to whether at least these could be selectively slaughtered, frozen and exported. Following a recent visit of a UK frozen food firm to the Islands, it has been established that a market exists in the UK for low quality sheep meat which is then used in food manufacturing processes.

In Appendix Two we show very approximately the costs of supplying such meat to the UK.

It can be seen from the calculation even on fairly optimistic assumptions on the number of sheep presented for slaughter, and taking no account of what the farmer would require for the animal or the cost of moving sheep to the abattoir, a mutton freezing/export operation would be highly marginal. The conclusion must therefore be that such a project is not economically feasible.

In any case, for the foreseeable future the garrison will provide a much more profitable outlet for any mutton carcasses of acceptable quality that can be made available.

6.4.3. The export of live sheep, say to the Middle East, is far more costly than that of shipping frozen stripped meat and is therefore not considered a viable economic proposition.

6.5 The creation of smaller farm units

6.5.1. Background

In the 1976 Report, we recommended that there was a strong case for the creation of smaller farm units from the dividing up of the very large farms. Some opportunity was seen to integrate small farm holdings with other diversified activities such as tourism and horticulture. The benefits were seen in both economic and social terms insofar as their creation would provide opportunities for more Falkland Islanders to have a stake in the Islands; owner-occupiership would in turn encourage reinvestment in the Islands. The structural situation was becoming increasingly unacceptable to many young Falkland Islanders, who were leaving the farms.

Since that time the Falkland Islands Company has sold one farm unit, Green Patch, to FIG which created and sold off (at subsidised prices and with soft-loan terms) six farm units. More recently another settlement, Roy Cove, has been sold to six independent buyers, including some outsiders, although the terms were not so advantageous to the buyers.

6.5.2. Economic aspects

It is too early to draw any firm conclusions as to the success or otherwise of these developments, but the following observations may be made:

- In the newly-created small units, the method of farming has not changed, that is, minimum supervision and the division of each farm into camps for the various classes of sheep.
- There has been little or no co-operation over sharing of facilities and use of pasture.
- Stocking rates are up but higher wool clip may not be sustained; fleece weight has decreased—see Table A1.18 in Appendix One.
- Labour productivity has improved.
- There would appear to be a strong commitment amongst the new owner-occupiers to the Falklands, and the general appearance of the farms has improved.
- The cost of providing infrastructure to service a number of small farms is clearly greater than that for a low number of larger farms. Even so, opportunities will be presented for units connected to the new Stanley/Goose Green road.
- Government tax revenue will fall as a result of the creation of new smaller farm units. For a fuller discussion see Section 3.5.2.

Overall it can perhaps be said that while the hoped-for social benefits would appear to have been realised by this development, and there is reason to believe that the longer-term reinvestment situation will also improve, there will be short to medium term adverse economic consequences resulting from the creation of smaller farm units.

6.5.3. Future development

Taking account of the observations made above, we have not changed our view that the creation of small farm units is desirable, although we would urge a

more positive attitude towards co-operation over resources among the new owners. The question arises as to whether smaller farm units might also be created by tenancy and share farming arrangements as well as by selling off the land.

One advantage of a tenancy arrangement is that it makes smaller capital demands on the tenant farmer, which would widen the opportunity for farming of small units to more Islanders. The disadvantage is that even assuming that a satisfactory law can be drawn up giving reasonable security of tenure, the tenant, at times of low wool prices, could well be squeezed out of business by a landowner anxious to maintain the level of his rent. Nevertheless, the possibility of creating tenancy arrangements should be explored.

6.6. Wool marketing

6.6.1. Existing system

Falkland wool is suited for high quality knitwear and for blending with other wools for a wide range of hosiery and woollen products due to its fineness, whiteness, resilience and strength. It is not a unique product and the Falklands supply only 2 per cent of the market for that type of wool. Its qualities are well recognised, and following recommendations in the 1976 Report, steps to realise an improved price for the wool have been undertaken. Recently a Falkland Wool label has been introduced to promote sales; the label is under the control of the Falkland Islands Sheepowners Association.

The wool clip is transported from the majority of farms to Stanley by sea and then shipped to the United Kingdom by charter vessel. FIC is the sole agent involved in transport, storage and insurance.

Following a recommendation in the 1976 Report, the FIG invited the Director of the New Zealand Wool Board to report on "Improved marketing methods and best markets for Falkland Islands Wool". The report, presented in 1979, limited its recommendations to options which were practical and involving minimal costs, both criteria being of particular importance to few producers marketing a low volume of product. A formalised system of marketing and income equalisation were considered inappropriate at that time, and probably still remain so. It was thought that producers could benefit from comprehensive market intelligence and the use of objective methods of assessing quality; these recommendations have now been implemented.

The suggestion that FIG/SOA should consider the purchase of FIC's 50 per cent share in the main buyer, David Smith & Company, in order to dispel the trapped feeling that pervades much discussion amongst growers, was not pursued because the company ceased trading, and its role in so far as the FIC are concerned has been replaced by Falkland Wool Sales, which is a part of the Falkland Islands Trading Company. The competitive base, although limited to four buyers, has been improved by the involvement of J. G. Field & Company (Illingworth Morris Group) who now act as agents for the majority of independent farms. In 1981 the FIC handled, on behalf of independent farms, approximately 16 per cent of the colony clip in addition to its own production of 44 per cent. The remaining clip was taken up by J. G. Field & Company (30 per cent); Jacomb Hoare, and Hammand (10 per cent). J. G. Field & Company increased their share of the market in 1981-82.

The majority of the wool is now sold on the basis of physical measurements and by direct negotiation between agent and producer, and largely due to the weekly provision of market information from Australia and New Zealand, on wool of comparable quality. In 1982 there was a tendency for the majority of growers to undertake forward selling.

6.6.2. Scope for improvement

Undoubtedly worthwhile progress has been made in the wool marketing operation since 1976. Further improvement in the wool price realised could only be achieved by better wool grading, fleece preparation and handling. This could be achieved through improved layout of wool sheds, which would allow better organisation of labour.

The availability of objective data on the quality of fleeces should lead to an improvement in the rate of progress achieved through breeding.

6.7 Conclusions and recommendations for future development of agriculture

6.7.1. Conclusions

Wool output has generally been falling since 1975. Poor financial margins have been obtained during the last six years and have been particularly low during the last two years. This deterioration, coupled with no real prospect of substantial improvement during the short-term future, requires urgent supportive and remedial action.

Investment during the 1960s and early 1970s was primarily related to improvements in housing, amenities and measures to improve labour productivity. During the last ten years investment in medium and long-term improvements, such as pasture improvement and fencing, redesign of wool sheds, and upgrading of jetties, has been negligible, and the consequences of the inaction, since Theophilus* emphasised this need in 1972, are now particularly serious.

There is a grave danger of regression to a primitive form of land utilisation as practised during the early phase of colonisation based on feral cattle.

Remedial action is urgently needed to achieve the following:

(a) investment in Falkland Islands agriculture;
(b) improved productivity on many farms;
(c) encouragement of diversification opportunities, where feasible, particularly in the production of foodstuffs for the garrison;
(d) better flock management in many cases;
(e) identification of methods of grasslands improvement;
(f) implementation of improvement schemes;
(g) injection of new attitudes to farming in the Falklands.

In Section 2.10 of the Conclusions, we have already discussed the need to achieve a change in the ownership pattern of Falkland Islands farms to stem

*Theophilus, T.W.D. (1972), *The Economics of Wool Production in the Falkland Islands*, FCO, ODA.

the flow of funds from the Islands. However, this in itself will be insufficient to induce the necessary level of investment required.

It is clear that a wider form of improvement grant system than the current fencing subsidy scheme will be required. In the UK, production grants and subsidies contribute substantially to the gross input and net farm income of hill and upland farms. Grants may account for up to 20 per cent of gross output and up to 74 per cent of net farm income. Such grants and subsidies currently available are shown in Table A1.19 of Appendix One. It is acknowledged that the introduction in the UK of both improvement and production grants resulted in a significant increase in medium and long-term assets. Falklands agriculture will require substantial support in the form of improvement and production grants to maintain the present system of farming and level of output and to permit diversification into other forms of crop and livestock production mainly associated with small farms and small-holdings within easy access of Stanley.

The long-term strategy for the improvement of land fertility and crop production must await the findings of the programme undertaken by the GTU. The current GTU, financed by HMG under Technical Co-operation, is costing about £0·4 million a year. We have already pointed out that a 10 per cent increase in productivity would yield an additional £0·25 million a year income at average 1975-81 wool price. The urgent need for sound advice regarding land improvement and animal management justifies a major increase in the level of support.

It is hoped that the re-establishment and enlargement of their activity will permit an early recovery from the serious setback to their progress arising from near total destruction of their property, facilities and records during the occupation.

6.7.2. Recommendations for action

Change of structure

Major recommendations regarding changes of ownership of the farms are discussed in the Conclusions—Section 2.5, and the implementation of such changes in the Recommendations—Section 2.10.2.

In relation to the formation of tenant farms we suggest that, while there is nothing to stop such private arrangements being got underway between landowner and potential tenant, it may be advisable to establish a Commission for Farm Tenancy, consisting of representatives from the sheepowners, potential tenants and of FIG, including the Agricultural Officer and, when appointed, the Chief Executive. The immediate task for the Commission would be to establish the likely viability of a tenancy arrangement in the Falkland Islands, the feasible basis for its establishment and to make recommendations on the drafting of laws under which the tenancy would operate. A sensible balance has to be struck between security of tenure and the ability of an owner to replace an obviously unsatisfactory tenant.

Furtherance of share farming arrangements may also be appropriate.

Grants/subsidies

An expert, probably from MAFF, should be appointed to examine and make recommendations for the establishment of a suitable Farm Improvement and Production Grants Scheme. It is debatable whether jetties should be included in such a scheme. They are a high cost item and might be better considered under transport/infrastructure improvements. The scheme should at least cover farm buildings, fencing, pasture improvement/drainage, shelter belts and flock improvement. In devising the scheme, full consideration will have to be given to the limited administrative capacity of the Falkland Islands' Agricultural Office.

It is very approximately estimated that the annual cost of providing a farm production and improvement grants scheme in the Falkland Islands would be of the order of £150,000-300,000 a year. This could include certain assistance with the establishment of smallholdings, although assistance in this area is also envisaged from the disbursement of Development Funds.

Extension of the Grasslands Trials Unit

The GTU currently comprises five scientific officers, including the leader and two technical assistants, and in addition three local persons providing secretariat, laboratory and general assistance.

The Unit has the collaboration of a recently appointed Agricultural Officer (FIG) whose main function is the administration of ordinances and regulations relating to agriculture. A trainee Agricultural Officer has been selected and is to undertake training in the United Kingdom.

The objectives of the GTU are as follows:

(a) To carry out investigations on vegetation and livestock production with the object of establishing the basic data necessary for the improvement of farming systems in the Falkland Islands.

(b) From these data and from other known data, to develop systems which are more efficient biologically and economically.

(c) To study the habits of the Upland and Brent geese with special reference to the effect that they have on the sheep farming industry, but bearing in mind conservationist factors and the value of the geese as a tourist attraction and a source of food.

The scale and efficiency of the GTU should be extended by the addition of up to three scientific officers, four technical assistants and further support from local recruitment as and when necessary. Improvements to the basic facilities for research and development work should be undertaken. These should include the provision of separate areas for research work on agronomy and development work on crop and animal production. These facilities would minimise the use of financial resources and non-productive time spent on air and land travel, reduce dependence on co-operation from station owners/managers at a time when labour availability is low, and give the freedom of action required to accomplish their objectives more speedily and effectively. The units would require adequate laboratories, animal housing, storage build-

ings, transport and machinery. The cost of increase in staff of the Grasslands Trials Unit is estimated to be about £350,000 a year in UK technical assistance. Assuming that approximately £200,000 is spent on the rehabilitation of the GTU, the cost of enlargement of the facilities for research and development work would be approximately £270,000.

The total annual cost of the GTU would then be of the order of £0·5 million a year. Such a concentrated research programme over five years might then cost in the order of £2·5 million. As noted in Section 6.3.1, if the application of improved farming methods resulting from such research work led to a sustained rise of 10 per cent in wool output, the economic benefits to the Islands would be of the order of £0·25 million a year at current wool prices. While such a modest improvement would yield a DCF return over 20 years of around 6 per cent only, viewed in marginal cost terms, the expenditure would seem justified against the alternative of more than doubling the time necessary for completion of the GTU's work before any benefit could be realised. By this time, the economic base of the Falklands might well have shrunk.

The GTU should give particular attention to the needs of small farms and small-holdings with respect to the production of appropriate forage and root crops and conservation of crops for the winter feeding period. This would have particular relevance to milk production, production of beef based on the use of calves from the dairy herd, finishing lambs, sheep and cattle, and in the management of suckler cows.

It is anticipated that advice will be sought by those undertaking field cultivation of vegetable and root crops for the local market and by those operating intensive units for animal production (poultry meat, eggs, pork, veal and "barley beef").

The highly successful sheep disease eradication and control schemes should be continued, and more emphasis given to moitoring internal parasites, and mineral and nutrient imbalances. Some attempt should be undertaken to assess the seasonal variation in the quality of carcasses presented in Stanley.

Small woods/shelter belts

In spite of slow growth, expert view is that there is no reason why trees could not be established on the Falkland Islands.

Suitably qualified personnel from the Forestry Commission should be appointed to advise on the establishment of nursery plantations in the Falklands, bearing in mind the utility value of shelter belts.

Establishment of Agricultural Department

The FIG appointed an Agricultural Officer in 1981, which represents the first phase in the establishment of the department which will eventually take over the functions of the GTU and thus be entirely responsible for administration, research and development. During the initial phase, the Agricultural Officer is primarily concerned with:

- administration of ordinances and regulations relating to agriculture;
- administration of Crown lands;
- provision of information particularly in relation to the activities of the GTU.

The reduced involvement of the GTU in projects outside Stanley should be offset by the circulation of news sheets, general talks to groups at settlements, meetings of a more technical nature and open days. The publication of the *GTU Green Handbook* was highly successful.

The second phase in the establishment of the department should await the outcome of the programme undertaken by the GTU during the next five years, when decisions concerning its function and structure should then be made. However, the AO clearly has an important role in matters concerning the transfer of farm ownership and in helping to oversee the establishment and operation of newly created smaller farm units, the encouragement of diversification in the production of food, and general support and liaison work with the GTU.

Also, at the appropriate time in the future, the Agricultural Office should be expected to include the appointment of an officer suitably qualified in farm business and management, to provide advice to farm managers and newly created owner-occupiers. He would also be required to evaluate and monitor production and improvement grants. The advice of MAFF should be sought. Consideration should be given to sponsored seminars on farm business and marketing aspects, possibly under the guidance of a leader recruited from overseas.

The expansion of the Agricultural Office would add some £30,000 a year to FIG costs, assuming that suitably qualified personnel could not be found in the Islands.

Agricultural education and training

Inclusion of Rural Science in the school syllabus is recommended, as are grants or scholarships for higher education. In the agricultural field these should enable Falkland Islanders to take appropriate courses in the United Kingdom. The Agricultural Training Board (UK) should be consulted regarding periodic visits by instructors to the Islands. Large farms should be encouraged to appoint and train a senior employee as part-time instructor and distributor of literature. A full-time instructor may eventually be required to service improvement schemes.

Wool production and marketing

Further investigation should be undertaken to assess the feasibility of a price equalisation scheme or an appropriate alternative to alleviate the fluctuation in price of wool.

The Animal Breeding Research Organisation should be asked to advise on methods of monitoring the quality of wool and on the selection and testing procedures best suited to the Falklands.

SECTION SEVEN

FISHERIES

7.1. Introduction

7.1.1. The waters around the Falkland Islands and the Dependencies can be divided into three areas in which the fishing opportunities are of different kinds. The areas differ in the following respects:

- the nature of the problems to be faced in the development of commercially-viable fisheries;
- the costs of development and size of investment required;
- the time that may elapse before commercially-viable fisheries could be established.

The first area comprises the coastal waters around the Falkland Islands themselves, the estuaries and rivers. In what follows, these are referred to as the *coastal waters*.

The second area comprises the open sea overlying that part of the Patagonian Shelf adjacent to the Falkland Islands. This area will be referred to as the *offshore waters*. These waters are part of the Southwest Atlantic, which is separated from the Southern Ocean proper by the very sharp and distinct oceanographic feature known as the Antarctic Convergence.

South Georgia and the other Dependencies to the south thereof lie beyond the Convergence, and the marine eco-systems and species are different from those of the Patagonian Shelf. This third area, south of the Antarctic Convergence, will be referred to as the *Southern Ocean*.

7.1.2. There have been two main changes in the economic environment of the world's fisheries since the writing of the 1976 Report. The first is the general adoption of 200-mile limits and the concomitant assumption by coastal states of rights of property in the fishery resources within the limits, and jurisdiction over the fisheries within the limits.

The second change is the increased costs of fishing arising mainly from increased fuel prices; these affect the costs of production of fishery products much more rapidly and directly than they do the costs of production of competing foodstuffs; partly for this reason prices have not yet adjusted sufficiently to restore the former levels of profitability. In the longer term, demand for fishery products for direct human consumption is expected to go on rising as world population increases and average personal incomes rise.

The effects of these changes, and others, on the rate of development and the prospects for the fisheries in the Falklands area will be noted later below, as will the situations that may arise and the opportunities that may present themselves depending upon the state of the relations between the United Kingdom and Argentina.

7.2. The coastal waters

7.2.1. Potential

In terms of likely annual yields of fishery products, the potential of the coastal waters is unknown. The species include crustaceans that could command high prices, as well as molluscs and fin fishes. There is also a possibility of establishing one or other species of salmon. It is appropriate to consider these categories separately.

It should be recognised at the outset that for the near to medium-term future, the commercial feasibility of even a smallish sized fishing project will depend upon export of a high-value product to an established market.

7.2.2. Coastal fin fish

7.2.2.1. Development

Fishing from boats by Falkland Islanders has been very limited. The Islanders, particularly those in Stanley, do not eat a great deal of fish. In theory there would appear to be an opportunity to develop a small-scale fishery to supply the enlarged local market provided by the garrison. However, to cover even the operating costs of a single 50-60 ft boat based in Stanley, it would be necessary to sell fish to the value of at least £3,500 a week. Even a garrison of dedicated fish eaters (which they are unlikely to be, especially if fish is unprocessed) could not manage such consumption rates.

The only economically feasible inshore fishing would be in small open boats of the type still to be found in some British coastal towns and villages. Unfortunately the Falkland Islanders have little tradition of fishing, even on a part-time basis. It is, nevertheless, a development to be encouraged, and one to which the Development Officer should give early attention. In this respect close liaison with the garrison would be required to establish the potential market. Loans from a development fund could be made available for the purchase of boat(s), gear and ice-making facilities.

7.2.2.2. Economic contribution

Given a certain requirement for fish from the garrison, it would be reasonable to suppose that the potential for the equivalent of two to four full-time jobs exists—a small beginning, but possibly the first steps for Falkland Islanders towards a livelihood based on the sea.

7.2.3. Shellfish fisheries

7.2.3.1. Potential development

In 1978 the ODA sent a fisheries team to the Falkland Islands. Their report* concluded that an inshore fishing survey should be carried out to assess the shellfish resources of the Islands such as squid, crab, crawfish and prawns.

**Report on a visit by a Fisheries Team to the Falkland Islands*, FCO, ODA, November 1978.

We endorse the view of the report that it is only a high-value product such as shellfish that is likely, in the near future, to overcome the high processing and transport costs to northern markets.

Export shellfish fisheries have been established in remote places, with the product being shipped to European, North American or Japanese markets. However, even following a favourable survey, for such a venture to be commercially successful it would be essential that:

(a) high catch rates were achievable of the valuable product—red crab (*centolla*), found around the Falklands, is one such species;

(b) high and consistent product quality would be required, necessitating a flexible and well-supervised processing workforce and system of collecting raw material from around the coasts†;

(c) a freezing plant and cold store would have to be built;

(d) a means of transporting low-temperature refrigerated containers to markets would have to exist.

Although British fish merchants, specialising in crustaceans, are already familiar with some of the problems of harvesting prawns and shrimps in remote areas of the world, a full investigation into these aspects as well as the shellfish resources themselves would be necessary before proposals for investment could be put forward.

7.2.3.2. Action proposed

On the basis of their report, the ODA have prepared up-to-date estimates of the likely costs of the necessary investigations, and first estimates of the subsequent need for investment if the results are favourable.

These can be summarised as:

- *A survey of the shellfish resources*—a minimum of £750,000 over three years.*
- *Investment following favourable survey*—£7-14 million* over a three-year period after completion of the survey.

The objectives of the proposed survey should be to identify method of capture, catch rates, location, seasonality, time of day etc; species, size and qualities, spoilage characteristics and other factors affecting processing and product quality. These objectives should be accorded higher priority than producing first estimates of biomass and sustainable yields.

If investment in fishing boats is seen to be justified, then consideration should be given to boats of glass-reinforced-plastic (GRP), which is repairable locally, rather than steel. Engines must be of proven reliability in fishing.

The fish processing plant would require a power supply and considerable quantities of water.

†The work could well be seasonal and would almost certainly require the importing of some skilled and experienced processing staff.
*These costs update the ODA estimates into 1982 prices.

7.2.3.3. Potential economic contribution

It is probable that any commercial export shellfish fisheries project would begin on a relatively small scale, employing, say, four to seven boats and 12-35 fishermen. The associated processing plant would require on a shift basis 15-20 per shift, with possibly two flexible shifts being needed. In total, then, some 30-55 jobs could be created which could grow, depending on the resource and markets.

Total income contribution to the Falkland Islands' economy with such a modest beginning might after the three year investment phase be of the order of £0·7-1·2 million a year. After an initial period of capital investment tax allowances, this revenue might yield government revenue of the order of £100,000-175,000 a year.

7.2.4. Salmon ranching

7.2.4.1. Potential

A recent survey of the Falkland Islands' rivers and estuaries, together with an assessment of the migratory behaviour of certain species of Atlantic and Pacific salmon was addressed to the possibility of a salmon ranching industry based in the Falkland Islands. However, the possibility of establishing a salmon run is yet to be proved. The ultimate size of any feasible salmon ranching activity will depend upon which species of salmon turns out to be most suited to the local environment, taking account also of the relatively small size of Falkland estuaries and rivers. The value of the salmon products will also depend upon the species and the market, which is in a state of change resulting from increased supplies of farmed Atlantic salmon, the most valuable species, from Norway and Scotland.

The survey recommended a salmon ranching (as opposed to farming) pilot project, similar to successful undertakings by American and Japanese teams in Chile. However, there are certain innovative features of the Falklands proposal, notably the use of sheep meat as a feed for the young salmon, which might significantly reduce rearing costs. The most attractive site appears to be Camilla Creek near Darwin.

7.2.4.2. Pilot project

A preliminary study is immediately required to establish the potential feasibility, and to define the pilot project. It is also necessary to update the economic and marketing assessment to determine:

- the size, value and location of markets,
- the means and costs of entry,
- the capital and operating costs of process and transport options,

in order that the commercial feasibility, and the optimum form and size of the project, be established.

The European Investment Bank might finance this project. Discussions are already underway in connection with this feasibility study. To finance a pilot scheme, lasting from three to five years, in which some four to five persons would be employed, £0·5-0·6 million would be required. It is possible that the EIB might finance up to 50 per cent of the future development costs, but it is hoped to attract commercial funds also. Support from ODA may well be necessary.

7.2.4.3. Cost and potential economic contribution

Full scale operation

If the idea were feasible and the pilot project were successful and if the scale of the next stage were as envisaged in the report, the total investment requirement for the commercial operation could involve £5-10 million of capital outlay. The majority of this would be for a processing plant.

It is essential that towards the end of the pilot stage steps should be taken to involve a commercial organisation who would provide a significant share of finance for the commercial-scale project. In total it is estimated that the labour requirement of a full-scale project would be of the order of 40-70 depending on its size. The operation could build up to a total turnover of the order of £1 million a year, from which government tax revenue might eventually be of the order of £90,000-150,000 a year. Such revenue would not be forthcoming in the initial years of the project. We consider a salmon ranching project as a particularly important opportunity, of a scale and nature suited to the Falkland Islands, and which could make an important contribution to the future economy of the Islands, if it is indeed possible to establish a salmon run.

7.3. The offshore waters

7.3.1. Potential

7.3.1.1. The potential yield of the fin fish and squid resources of the entire Patagonian Shelf is estimated at about 4-5 million tons a year. These estimates are based upon general considerations of biological productivity in the area and on such survey work and commercial fishing as has been reported. What fraction of this could be taken in that sea area where the nearest land mass is the Falkland Islands is not known, but the yield of blue whiting from the Burdwood Bank alone may be as much as one million tons a year. The stocks are only lightly exploited at present.

7.3.1.2. Total world fish production from all sources including fresh waters and aquaculture is something over 70 million tons a year. The largest under-exploited stocks of fish of familiar size and appearance are off the east and west coasts of North America, but the Patagonian resources are probably the next largest. They include a species of hake (*Merluccius polylepis*) and squid, both of which are already commercially important.

7.3.2. Recent history of the fishery

7.3.2.1. The 1976 Report referred to two earlier attempts to assess the commercial potential in the area, involving two large Japanese stern trawlers, *Taiyo Co*, in 1974-75 and one British freezer trawler, *Boston Lincoln*, in 1972. The British vessel was on charter to British consultants working for Argentine interests; a British trawler-owning firm had access to the Japanese results. Neither of these investigations led to further action on the part of the British.

7.3.2.2. In 1978-79 the Japanese Research Vessel, *Shinkai Maru*, and the West German Research Vessel, *Walther Herwig*, with one German commercial trawler, *Marburg*, carried out several cruises in the area during which the demersal fish stocks were assessed by random sampling. These investigations

were carried out on behalf of, and in collaboration with, the Argentine fisheries authorities, and the results have been published by them. The primary objective of such work is to provide an estimate of biomass and hence a first estimate of sustainable yield, but the records of individual hauls may provide a rough indication of whether a commercial trawler might have enjoyed acceptable catch rates at the same time and place.

Very recently, Argentina accepted delivery from West Germany of a large new fisheries research vessel and is believed to be in the process of acquiring a second.

7.3.2.3. The Argentine commercial fishing industry is at present concentrated in the north of the country, the principal fishing base being Mar del Plata. There is little prospect of Argentine fishing enterprises or Argentine fishermen moving south to Patagonia, and the existing infrastructure in that area is inadequate to support a full-scale fishery.

For these reasons, Argentina has in recent years tried to foster development of the Patagonian fisheries through joint ventures with foreign fishing enterprises, including Spaniards, Poles and Japanese. In all cases, the motive of the foreign vessel operators in entering the Patagonian fishery was probably the need to seek new fishing opportunities, following exclusion from traditional fishing grounds as a result of extensions of fisheries limits, rather than that the fishing opportunities on the Patagonian Shelf appeared especially attractive. This is borne out by the fact that catches in 1980, the last year for which official FAO statistics are available, were actually lower than in 1979, not because of overfishing, but because of reduced effort on the part of the Spaniards and Japanese as a result of increases in the costs of fishing.

Argentina invited Poland a few years ago to participate in a collaborative project for development of the Patagonian fisheries, in which Poland would construct or develop fishing ports and harbours as well as prosecute the fisheries. This offer was not taken up, partly because the necessary capital was not available to the Poles.

The Poles continue to fish in the area, as do the Russians from time to time.

7.3.3. Markets for offshore fish

The market of first choice for hake would be that in the United States and the United Kingdom, where it would be imported in the form of frozen white fish fillet blocks. It would be in direct competition with similar products from Norway, Iceland, Canada and Polish operations in the Northern Hemisphere. It would also be in competition with hake (of another species) caught by the existing Argentinian fleet in the north and by the Uruguayan fleet, using smaller vessels than have up to now operated on the Patagonian Shelf, which fish at short distances from their bases and enjoy fairly high rates of catch; the fish is filleted and frozen onshore.

The southern hake spoils more rapidly than cod, so that to handle it correctly and to make a good product is more difficult.

Other, less lucrative, markets, which include dried stockfish, are in Brazil and West Africa.

The markets for squid are mainly in the Mediterranean countries and in Japan.

7.3.4. Development considerations

7.3.4.1. The market for white fish fillet blocks is currently in one of its occasional states of depression which, previous experience suggests, may last very many months unless the prices of competing foodstuffs continue to rise. Since the Patagonian grounds are the furthest from the markets, it may be that there will be no great incentive to develop this fishery until rising world demand eventually makes it sufficiently profitable, perhaps some years hence. However, the present costs of production on these grounds are those of large freezer or factory trawlers and it is possible that the use of much smaller and simpler vessels, landing their catches into freezing plants in the Falklands, might be a less costly system of harvesting, if the costs of providing the necessary infrastructure are neglected. To evaluate such a system requires information that is not available; how this might be obtained is discussed below. Meanwhile, also as discussed more fully below, the Poles may continue to be interested in prosecuting the fishery using their existing autonomous, very long-range fleets with supply vessels and refrigerated transports.

7.3.4.2. The hake may be a suitable raw material for the manufacture of *surimi*, the market for which is however confined to Japan and which is very demanding as regards quality. Only Japanese have the necessary knowledge and experience at present.

7.3.4.3. The blue whiting is heavily parasitised and initially it may be most practicable to utilise it as fish meal for animal feed. This is a specialised operation carried on only by a few long-distance vessels, none of them British. It may possibly be economic to harvest it using small, simple vessels landing their catches into fish meal plants on the Falklands. However, without a ready and relatively cheap source of energy, as for example exists in Patagonia in the form of locally produced natural gas, it is thought unlikely that a fish meal processing operation based on the Falkland Islands would be economically viable. It would in any case be essential to acquire information on catch rates, times and places, seasonality and so on.

7.3.4.4. In the light of the above, it is scarcely surprising that neither the West German fishing enterprises operating large freezer and factory trawlers, nor their British counterparts, have as yet evinced any enthusiasm for entering the commercial fishery on the Patagonian Shelf, as distinct from engaging in exploratory fishing supported from public funds. Moreover, there is a stock of blue whiting in the western approaches to the United Kingdom, and stocks of squid, in the harvesting of which the British fleet has up to now played only a small part. Now there is the added problem for the British that the nearest bases open to their freezer trawlers may be Montevideo or Punta Arenas, and for repairs they might have to resort to Rio or even Capetown.

7.3.4.5. Nevertheless, at least one British-based fishing enterprise has expressed interest in entering the fishery, initially on the scale of perhaps only one or two motor fishing vessels of the Scandinavian type, about 60 feet in overall length, that operate out of Grimsby. The methods of capture normally used by these

vessels are anchor-seining and two-boat trawling; whether they would be effective on the Patagonian Shelf would have to be the subject of trial. Even for this class of vessel, the depths of water at Stanley jetty are scarcely adequate. Infrastructure such as a slipway and repair shop, net lofts and stores, would be required as well as an ice plant, freezing plant and cold store. A British firm has expressed interest in setting up a processing plant.

7.3.5. Fisheries management and politics

7.3.5.1. Establishment of a 200-mile fisheries limit

One of the strongest arguments for establishing 200-mile limits, now general throughout the world, is that it makes it easier for the coastal state to devise and enforce effective measures for the long-term conservation of the stocks and for the control of the size of the fleet so as to avoid the over-investment that has occurred in most fisheries in the past, leading to low profitability; another is that the coastal state can exercise sovereign rights to exploit in the resource and thus derive an economic rent from the fishery without necessarily engaging in fishing—by sale of licences or exchanging them for other benefits from foreign fleets licensed to fish.

At present British claims a three-mile territorial sea around the Falkland Islands, and has not declared a 200-mile fisheries limit or territorial sea (the normal South American arrangement). Argentina has declared a 200-mile territorial sea.

Some reports issued by the Argentine fisheries authorities (on subjects other than fisheries limits as such) contain maps of the area showing the 200-mile limit lines and also a median line. But these technical documents are contradicted by the official Argentine position in the UN Law of the Sea Conference, where they were leading opponents of 200-mile economic zones and continental shelves based on dependent territories where title was disputed. Argentina must also be expected to argue that its claim to sovereignty over the Islands carries with it a claim to the adjacent maritime zones.

There is an area, to the north of the Falklands, where the Patagonian Shelf (defined as extending to the 200-metre depth contour) extends beyond the 200-mile limits. Much of the catches of foreign fleets, such as the Polish fleet, are reported as coming from this area, but it is likely that some of it, perhaps most, is in fact taken inside the limits.

It is difficult to see how Britain (or Argentina) can ensure continuing economic benefits from the offshore fisheries of the Falklands—benefits which may not begin to flow for some years yet, as explained above—unless they declare a 200-mile limit and exercise effective surveillance in the sea areas within the limit line.

7.3.5.2. Licensing and surveillance

It is not certain, as pointed out in the White Fish Authority Report* prepared for ODA in 1979, that the benefits from the fishery (whether by way of profits from fishing or from licences) would be sufficient to justify the costs of effective surveillance; experience in other parts of the world varies. The question cannot

**Fisheries Opportunities in the South West Atlantic*, White Fish Authority Industrial Development Unit, ODA, 1979.

be answered without a knowledge of likely rates of catch and of the value of the highest-valued products it would be possible to make from the raw material, which would govern the cost of the licence. This information does not exist.

It is possible that in the immediate future the costs of surveillance, if exercised by the British, need not be charged to the fishery in their entirety, or indeed at all, if suitable means of surveillance are deployed for defence purposes.

If the attitude of Argentina to the British, or to a British declaration of a 200-mile limit related either to fisheries or to oil and minerals, is hostile, they have the possibility of creating incidents without risking their own ships. This possibility exists because not only the USSR, but also Cuba, possesses a long-range fishing fleet: Argentina could therefore, if she chose and the other party were willing, issue licences to fish in Falklands waters to Russian or Cuban vessels.

7.3.5.3. Co-operation in fisheries management

In order to exercise effective management and conservation of the fisheries, and thereby ensure continuing economic benefits, the ideal situation would be a state of friendly collaboration between Britain and Argentina, in which the fisheries would be managed jointly. If it were believed necessary or desirable to make a substantial gesture to Argentina, a proposal to undertake such a development would presumably be acceptable to the extent that it is already regarded by them as desirable.

It also has to be recognised and accepted by Britain that most of the stocks of fish on the portion of the Patagonian Shelf adjacent to the Falklands almost certainly extend over those parts of the Shelf adjacent to Argentina and are what is known to fisheries scientists and administrators as shared stocks. The implication is that effective conservation and management, to ensure continuing economic benefits, will not be possible without the co-operation of the Argentines, at least to the extent of exchanging scientific information and statistics relating to the operations of commercial fishing vessels in the area. That is to say, unless at least this degree of co-operation can be attained, any economic benefits from the offshore fisheries are at risk from overfishing.

It may be noted in passing that just before the Falklands emergency began, the FAO had drafted invitations to various countries to participate in a conference on problems related to the management of certain stocks in the South-west Atlantic. Discussion was to be limited to the stocks in the sea areas north of latitude 45°S or 48°S, beyond any conceivable Falklands limits. Nevertheless, because the northern limit of distribution of the Patagonian stocks is around 40°S, the issue of the invitations has been postponed until it is ascertained whether the British would wish to participate and, if so, whether this would be acceptable to the Argentines and to Uruguay and Brazil. The answer to these questions may possibly be some sort of indication of what the future state of relations may be on fisheries matters.

7.3.6. Future development options

7.3.6.1. Information requirements

As indicated above, current levels of fish demand and prices in world markets are apparently not yet attractive enough to induce operators of freezer trawlers

or factory trawlers to enter the offshore fisheries of the Falklands. It is conceivable that smaller, simpler types of vessel based on the Falklands and delivering their catches to processing plants on shore might be profitable, assuming that the necessary onshore plant, infrastructure and back-up services were in place and paid for. The fact that the Polish fleet is currently fishing these offshore areas does not necessarily imply that a commercial fishing potential currently exists. The special economic circumstances of the Poles could well dictate quite different criteria of acceptable economic returns.

The information at present available to the British is not sufficient to allow well-informed conclusions to be reached about what levels of price and demand would justify engaging in the offshore fisheries, and what methods and systems it would be best to adopt in prosecuting the fisheries. This deficiency should be made good as soon as possible, if there is any intention of deriving economic benefits from the offshore fisheries in the future.

It is possible that individual British commercial fishing enterprises have contacts in Vigo, Tokyo or even Gdansk from whom fishing information can be obtained, but there is no indication that this is indeed the case. It is therefore necessary to gather new and up-to-date fishing information as well as to come to independent conclusions about possible forms and values of products and about potential markets. It may also be necessary to make additional surveys to supplement and improve the estimates of biomass and sustainable yield that can be derived from the limited quantity of data produced by the German and Japanese research vessels.

7.3.6.2. Exploratory fishing

Summarising the position, we conclude that:

- exploratory fishing is necessary, although it may be possible to obtain at least some of this information through collaboration with the Polish fleet—see below;
- further surveys of the offshore stocks are desirable;
- investigations into the handling and processing characteristics of the raw material and into possible products are also necessary.

The last-named task falls within the field of expertise of the Torry Research Station of the Ministry of Agriculture, Fisheries and Food. The Station operates the Research Vessel *George Reay*, which is of a suitable size and suitably equipped.

Surveys of fish stocks lie in the field of expertise of the Fisheries Laboratory of MAFF in Lowestoft and the Marine Laboratory of the Department of Agricultural and Fisheries for Scotland (DAFS) in Aberdeen. Both operate suitable vessels, but it may be cheaper and more convenient to equip the *George Reay* to carry out this task also and to embark the necessary staff from the other laboratories in her.

All three laboratories have on-going commitments to the British fish industry and may require reinforcement or revision of their normal programmes of work in order to allow them to undertake the necessary investigations.*

*The ODA and its associated research establishments do not possess the staff, the vessels or the experience of temperate-latitude fisheries to be able to carry out such work. The British Antarctic Survey possesses limited capability in the fields of fishing, fisheries science or fisheries technology.

Exploratory fishing aimed at producing the kind of fishing information specified in 7.3.6.1 above, which would allow a choice to be made of the best system to adopt and investment decisions to be made, will produce sufficient reliable information only if carried out by commercial fishing vessels commanded by master fishermen of exceptional skill and experience and manned by highly-trained and versatile crews.

Commercial fishing enterprises, however, are not skilled in the planning and execution of such projects or in the analysis of the data. In order that the maximum amount of reliable information is produced, the operations must be recorded, and the data subsequently analysed and interpreted by people skilled and experienced in supervising exploratory fishing projects and in assessing market possibilities.

Most of the skill and experience of this kind, and especially of organising and conducting exploratory fishing at great distances from the home base, lay in the Industrial Development Unit of the White Fish Authority. Unfortunately the Sea Fish Industry Authority has virtually disbanded the Unit. It would therefore be necessary to make *ad hoc* arrangements to manage any exploratory fishing project; however, the services of some experienced individuals may still be available.

Briefly, the main effort should be made using Scottish-type motor fishing vessels of about 85 feet LOA (length overall), equipped for bottom-seining Scottish style, single-boat and two-boat trawling both on the bottom and in midwater; long-lining and gillnetting. Two vessels should be sent out initially, and these might subsequently be purchased and remain in the Islands as transport vessels if no commercial fishery develops immediately. The area of continental shelf to be covered, however, is so great that as soon as there are favourable indications, the number of vessels should be increased to five. The exploration should continue for at least one whole year. The greater part of the catches would have to be dumped, although some of it could be sold to the local market and garrison in the Islands.

This effort might be supplemented by deploying, in addition, a factory trawler. The argument for this, as explained in the White Fish Authority report to ODA of 1979, is that catches might be processed and sold to meet part of the expenses. Too much reliance should not be placed on this; it is unlikely that a fair price would be received even for the hake, and the demand is, as noted earlier, depressed. The processing machinery might have to be modified to suit the Patagonian species. Such a vessel is capable of using only two methods of capture: bottom trawling and midwater trawling. She would have to be based in Montevideo or Punta Arenas, and might have to go to Rio or Capetown for drydocking and certain kinds of repairs. Whether there will be any factory trawler remaining in the British fleet by the time the exercise could be mounted is by no means certain.

7.3.6.3. Infrastructure/back-up services required

Neither the 85 feet LOA Scottish-type trawler, nor the aforementioned factory trawler could get alongside the existing Stanley jetty. In Section 12.4 of this report we discuss the need for a new jetty, possibly in Stanley, in order to provide the necessary deep-water berth and handling facilities to support future

development activities, as well as being of use to the Navy. It is possible that such a jetty could service trawlers involved in exploratory fishing, although it would not be ideal—strength is of particular importance in accommodating the berthing of a laden trawler after an arduous fishing trip.

However, while any subsequent sizeable fisheries development would require a more suitable harbour such as is perhaps available at Port San Carlos, Ajax Bay or Albemarle, it would be hard to justify such a major new harbour development for exploratory fishing. It would appear, therefore, that suitable arrangements would have to be made in Port Stanley or Port William, unless a separate harbour was to be built to service the Navy.

As far as fuel, stores and back-up services are concerned, including that of echo-sounding equipment, the presence of the Navy should allow necessary supplies and support services to be available.

7.3.6.4. Costs of exploratory fishing

In such exploratory fishing projects, the basic terms of charter are full compensation to owner and crew for loss of earnings. In addition, there would be costs of extra equipment, including satellite navigation and extra fishing gear; additional insurance; provision to cover higher costs of fuel, stores and services; costs associated with crew leave and replacement; there would also be the costs of supervising the project and analysing the results.

ODA have revised the estimate of cost of development of the offshore fisheries and now put it at up to £20 million from public funds over the first five years. This sum would cover up to two years of exploratory fishing along the lines recommended above, together with the operations of the *George Reay* and any associated survey work, and assuming no return from sale of catches.

7.3.6.5. Other means of gathering offshore fishing information

There is one other possible way of acquiring fishing information about the offshore grounds that would be cheaper than the exploratory fishing project recommended above. The Polish fleet is anxiously seeking new fishing opportunities as a result of exclusion from the Gulf of Alaska, and Poland is in need of additional and assured supplies of fish. There is therefore good reason to believe that the Polish effort in Patagonia would be increased if the coastal state or states formally accorded them fishing rights within the 200-mile limits as claimed by Argentina. If, therefore, the British declared an extended fisheries zone around the Falklands, it could enable the British to give the Poles formal rights to fish for a number of years in return for an undertaking to deploy an agreed number of vessels and to receive observers on board.

This proposal, and the earlier recommendation to carry out exploratory fishing (7.3.6.2 above) are not mutually exclusive; it would be possible to do both and thereby to produce more detailed information more quickly.

The work on handling and processing, requiring the use of R.V. *George Reay*, would still be desirable, and also the additional survey work (7.3.6.2 above).

7.3.7. Commercial fisheries development

If the results of the exploratory fishing are sufficiently favourable, at least one British operator of motor-fishing vessels in the 60-85 ft class may be willing to

mount a commercial operation, initially on the scale of one or two boats. Even this, however, would have to catch much more fish than could be consumed by the resident population and garrison if it were to be profitable: it would be necessary to find an export market for the bulk of the catch.

The export of fish on any scale would involve processing in one way or other—currently it would appear that this would be into white fish fillet blocks. It is doubtful whether such an operation could operate successfully below a certain economic size; equally it is improbable that the current world white fish market would economically sustain this operation, although this is determined crucially by catch rates achievable.

However, a smaller-scale operation along the lines indicated earlier in this section may just possibly be carried by freezing and exporting fish in freezer containers to the UK. This would more likely be commercially viable if it rode on the back of a commercial shell fisheries export operation. Again, catch rates and location of fishing grounds would be crucial in this respect.

Because of uncertainties over the outcome of exploratory fishing and the future state of the world white fish market, it is not reasonable to postulate the size and timing of any future offshore fishing that might be based on the Falkland Islands. What is more likely is that the resource will one day be exploited, and there are good arguments for the British Government to become better informed of the future potential opportunities.

7.3.8. Recommendations

7.3.8.1. We **recommend** that in order to secure the future economic benefits from the offshore fisheries of the Falklands, the United Kingdom should adopt for the Falklands the regime now accepted as normal world-wide, namely, a fisheries limit of 200 miles. This would incidentally remove the anomaly that Argentina already claims control over the waters extending 200 miles from the Falklands, but Britain does not; it would also remove one deterrent to commercial development.

7.3.8.2. Action should be taken immediately to obtain the information necessary in order to allow decisions to be made on the best system for exploiting the offshore waters: very long-range autonomous fleets; or freezer or factory trawlers based on the mainland; or smaller vessels landing their catches into processing plants on the Falklands. The same kinds of information are necessary to allow well-informed investment proposals to be formulated. To obtain the information requires the mounting of an exploratory fishing project financed from public funds, together with the temporary deployment of R.V. *George Reay* and staff of the Torry Research Station and Fisheries Laboratories, all as outlined in Section 7.3.6.2 above. **Consideration** should also be given to the proposal put forward in Section 7.3.6.5.

7.4. The Southern Ocean

7.4.1. Potential

7.4.1.1. Fin fish

The known fin fish resources in the general area of South Georgia yield a few tens of thousand of tons of very palatable fish in a year. They have been fished

mainly by the Russians and Poles. The known stocks are heavily exploited; however, fishing is believed to have been confined so far to trawling on comparatively small areas of reasonably smooth bottom; it is possible that the use of appropriate trawl gear and techniques (such as were developed by German skippers for the very rough ground at East Greenland), or long-lining, would reveal that the stocks are bigger than at present supposed. Juveniles of one of the main species (*Notothenia rossii marmorata*) are present in abundance in the coastal waters of South Georgia.

7.4.1.2. Krill

The Antarctic krill (*Euphausia superba*) appear to constitute the biggest known reserves of animal protein in the world. Potential sustainable yield has been estimated at from 50 million to 150 million tons a year for the Southern Ocean as a whole. A very substantial proportion of this appears to occur in the sea areas within 200 miles of South Georgia, the island arc to the south forming the eastern boundary of the Scotia Sea, and the Antarctic Peninsula. The nearest coastal states with permanently settled human populations are Chile, Argentina, South Africa, Australia, New Zealand and the Falkland Islands themselves.

The present level of exploitation is a few hundreds of thousands of tons a year, taken mainly by the Russians but also by Japanese and Poles, and by others on a more experimental basis, including Chile.

7.4.1.3. Seals

The seal populations on South Georgia have been growing rapidly. Subject to the advice of the British Antarctic Survey, it may become desirable to cull these populations for their own good. The nations possessing a commercial sealing capability include Canada, Norway, the USSR and Uruguay.

7.4.2. State of development

7.4.2.1. Capture

Effective catching techniques for krill were developed by the West Germans (R.V. *Walther Herwig* and the chartered commercial trawler *Weser*), in the summer season 1975-76, and shortly thereafter also by the Japanese. A big stern trawler can in very favourable circumstances catch a few hundreds of tons in a day.

7.4.2.2. Processing and products

Various kinds of products have been developed. Antarctic krill is a shrimp-like creature with an average length overall of 4 cm and a maximum of 6 cm. Frozen whole krill, machine-peeled krill tails, fish fingers made from krill, and various pastes and protein extracts have been made on the experimental scale, some of which are very attractive in flavour and texture, others not so. Krill meal for animal feed has also been produced.*

The development of products and processes has been undertaken by the Japanese, the Poles, the Russians (with Norwegian help) and the Chileans. It is

*Other products are possible, as outlined in a report of the FAO/UNDP Southern Ocean Project (*The Utilisation of Krill*, G. Grantham, FAO GLO/SO/3, 1977).

still in an early stage, and all products, including krill meal, are under evaluation regarding their nutritional properties.
Until krill process technology is developed to the point where an acceptable product can be produced at economic cost, the krill resource will remain only lightly exploited.

7.4.2.3. Future development
The harvesting and processing of krill requires high technology and also the skills possessed only by those experienced in the management of long-distance factory trawler fleets operating in high latitudes. Such capabilities are possessed by Norway, Spain, Poland, Japan, West Germany, the United Kingdom and the USSR, but not by the USA.

None of these nations, however, is in great need at present of access to new sources of animal protein for direct human consumption, except perhaps Poland. Norway is likely to be interested mainly in the possibilities of krill for animal feeds. The nations of the Third World in most need of the protein do not possess the capability to harvest the krill and might not be able to afford to pay a price covering the full costs of production, although this still remains to be seen.

The situation is therefore similar in some ways to that regarding the minerals of the ocean floor beyond the 200-mile limits, and for this reason among others, and the significance of the resource in terms of world food supplies, the United Nations mounted a project for the development of the fisheries of the Southern Ocean in 1976-77. This project never got beyond the preparatory phase because of objections by Argentina based on arguments regarding sovereignty.

All of the three experts engaged by FAO to work on the project were British. Despite this, the British have so far played a very minor part in the development of the technology for harvesting and utilising krill. Official circles were too quick to come to an adverse conclusion on the possibilities as a result of examining some early, crude products and some raw material brought to Western Europe that had been badly handled, frozen and stored. Because of the small size and the fact that its physiology is adapted to very low water temperatures, krill spoils very quickly, and it is necessary to process it soon after catching if a stable product of high quality is to be obtained. Nevertheless, the British possess as good capabilities as any to carry out, or assist in carrying out, the further development of effective processes and systems.

As and when a large commercial fishery develops, it will be highly desirable to establish a system of telecommunications to allow daily reporting of position and catch, with associated navigational aids and search-and-rescue services based on nearby land such as Tierra del Fuego, South Georgia and the Falkland Islands.

7.4.3. Political context
7.4.3.1. Antarctic Treaty
Antarctica to the south of latitude 60°S is the subject of the Antarctic Treaty, of which most nations are eligible to apply for membership, regardless of whether they have any previous association with the area. It provides *inter alia* that claims of sovereignty shall remain in abeyance. It applies to the land masses and the territorial seas, but not to the high seas as generally defined when the Treaty was prepared in 1959-60. Any claim of jurisdiction over an extended

economic zone or territorial sea in the area implies a claim to sovereignty over the adjacent land. Australia has made such a claim regarding the seas adjoining the sector of Antarctica nearest to Australia, and monitors the movement of shipping and aircraft in the area.

As the commercial fishery develops (and when eventually exploration for hydrocarbons begins), claims to sovereignty are bound to be reasserted, and there may be a need to revise the Treaty.

More recently a Convention on the Conservation of Antarctic Marine Living Resources has been agreed by a number of nations including the United Kingdom. This applies to such resources south of the Antarctic Convergence, which in the South Georgia area is defined as running along latitude 50°S. The Convention commits signatory nations to a policy of management of exploited stocks which has regard to the well-being of the ecosystem as a whole, and is unique among fishery conventions in this respect.

7.4.3.2. Establishment of an economic zone

South Georgia lies well to the north of latitude 60°S, so there is no impediment to the declaration of an extended economic zone around the archipelago, around the Shag Rocks to the west, or around the South Sandwich Islands. As explained in the previous section, 7.3.5.3, part of the fish and krill stocks of the Southern Ocean may be shared stocks.

7.4.3.3. Conservation

Questions of industrial and commercial activity on the land masses of Antarctica and the adjacent islands are not addressed by the terms of the Treaty. The exploitation of the fishery resources including krill, on the other hand, if carried out under the Convention, should not represent any threat to the environment or to the survival of species. In contrast to the situation regarding the whales and the seals—covered by separate conventions— there is little or no practical risk of any species of fish or crustacean becoming extinct as a result of the activities of man.

7.4.4. Development

7.4.4.1. Most of the fishing in the area has so far been done by large freezer trawlers or factory trawlers operating from advanced bases in South America, South Africa, Australia or New Zealand. Some has been done by long-distance autonomous fleets operating from their home bases in Poland, Japan and USSR.

Such systems will always be necessary to harvest some areas of the Southern Ocean. An FAO report of 1977 envisaged factory trawlers larger than any now in existence; their construction and operation would not however present any new technical problem.

The Russians have already discussed with a Finnish shipyard the construction of prototypes of a new class of trawler capable of fishing in dense pack-ice, and design studies have also been carried out in Poland.

7.4.4.2. The mainlands of Argentina and Chile, and South Georgia, are near enough to allow fishing of krill and other species in the adjacent sea areas by very much smaller and simpler vessels landing their catches into processing

plants on shore. Chile has already carried out trials of such a system, using conventional trawlers equipped to preserve their catches in a chilled state, to fish the areas adjacent to the Peninsula, across the Drake Passage.

Fishing opportunities occur off South Georgia at much shorter distances than the Chilean vessels have to cover. A modern Scottish-type motor fishing vessel of 25-30 metres LOA is much more seaworthy than the whale catchers that used to operate out of Grytviken, Leith Harbour and Stromness. Whether a system based on such vessels feeding onshore processing plants, for example in South Georgia, is feasible, would have to be the subject of practical trial. The principal unknowns are the locations where good fishing is likely and their distances from the bases in South Georgia, the catch rates, and the maximum time that can be permitted to elapse between catching and processing. With regard to the first point, recent observations indicate intense trawler activity immediately seaward of the bay systems where the old whaling stations are situated, so it is likely that fishing distances would be short.

7.4.4.3. Timing for development

Commercial krill fishing is unlikely to develop into a major industry for at least some and possibly many years, but this particular option open to the British in South Georgia should be the subject of trials in the fairly near future in order to provide guidance on decisions as to the future economic development of South Georgia. It would be most conveniently carried out while naval vessels and garrisons are based there.

Another possibility to be borne in mind is the charging of licence fees to foreign vessels fishing the area.

7.4.4.4. UN Southern Ocean Project

The present situation provides the opportunity for an attempt to revive the United Nations Southern Ocean Project. Britain possesses the kinds of fisheries research vessels, scientific and technical skills and commercial fishing vesssels that would be required if FAO were to embark upon practical investigations and for the provision of which the UN would presumably pay if so required, if the project is properly formulated and funded.

7.4.5. Recommendations

7.4.5.1. In order to help secure continuing economic benefits from the fisheries in the area when they are eventually developed, Britain should declare 200-mile fisheries limits around South Georgia, the South Sandwich Islands and, as and when it becomes practicable, around the other dependencies to the south.

7.4.5.2. Britain should seek to revive the United Nations Southern Ocean Project, and offer the services of scientists, technologists and vessels as may be required, on repayment or not as may be decided.

7.4.5.3. Through a revived Southern Ocean Project, or failing that, independently by Britain, the technical possibilities of fishing the sea area around South Georgia by small and simple vessels based thereon should be investigated. A thorough investigation would take a similar form to that recommended for the offshore fisheries of the Falklands in 7.3.6.2 to 7.3.6.4 above, and might cost £10-20 million. The investigations should include trials of fishing for the fin fish *Notothenia rossii marmorata* on rough bottoms, as well as for krill in the mid- and surface waters.

SECTION EIGHT

TOURISM

8.1. Resources and development potential

8.1.1. In the 1976 Report we concluded that in their wildlife resources the Falkland Islands possessed the potential for the development of a small but worthwhile tourism industry. This view has since been confirmed by other experts with worldwide experience of wildlife tourism who have visited the Islands. The principal attractions are the large and accessible rookeries of several species of penguin, colonies of albatross and other sea birds, as well as the seals and sea lions, which can be seen in remote unspoilt scenery. The Islands also have certain historical interest, particularly for Americans, because of the many wrecks of sail and early steam ships from the era of the Cape Horn route to San Francisco at the time of the gold rush.

8.1.2. The Islands have in fact been regularly visited by up to 300-400 tourists a year, and a similar number from a specialist tourist ship visiting places of interest. The potential, if fully realised, might eventually amount to 2,000-3,000 a year, bearing in mind the season only lasts for about five months. In 1980-81 a tourist operation, involving the chartering of a 70 ft ten-passenger vessel, was established. However, it failed to achieve the hoped-for number of tourists, and collapsed after one year. The principal cause of failure was the poor marketing and promotion, although the venture was seriously under-financed* and the boat not very suitable. However, we believe the concept was sound, that is, providing tours of up to a week (or possibly more) by ferrying people to points of interest around the Islands. Accommodation could be provided in the settlements thus providing a useful additional, and in some cases the primary, source of income.

8.2. Constraints to tourism development

8.2.1. There are several constraints to the realisation of the tourist potential of the Falklands.

(a) *External communications*—The establishment of a regular air service, allowing the booking of blocked seats by tour operators is of course essential for the development of tourism. It is considered that direct flights from major South American cities, rather than the more expensive and time-consuming routes via smaller southern airports such as Comodoro Rivadavia and Punta Arenas would facilitate this development.

*No private Falkland Island capital was forthcoming, although the FIG provided £25,000.

(b) *Access to the South American market*—At least half of the tourist market for the Falkland Islands lies in South America, mostly in Argentina itself.* It is therefore probable that without a changed political climate, the tourist potential of the Islands is limited to 1,000-1,500.

(c) *Hotel facilities*—Although not the primary place of interest for tourists, it would be necessary for a new hotel to be built in Stanley if significant numbers of wildlife tours were to be accommodated. Based on experience in the Western Isles of Scotland, a new 20-25 bedroom hotel would cost of the order of £1 million. Enlarged and improved boarding houses and self-catering arrangements in some of the settlements would also be required.

(d) *Internal communications*—Quite apart from the need for a suitable boat, with some passenger accommodation, a more frequent air service to some of the more outlying places of interest, particularly West Falkland, as well as road development, would be necessary if tourism is to develop.

(e) *Organisation and liaison*—Without a tourism office in the Falkland Islands with close links to marketing and promotion agents in Europe and North America, there is little likelihood that a significant and properly managed tourist industry could be established.

8.3. Development of tourism

8.3.1. Quite clearly until the problem of external communications has been resolved, there is a limited amount which can be done to develop wildlife tourism in the Falkland Islands. The manner in which it is resolved, together with the future political climate, will determine the size of the tourist potential. However, the presence of a garrison provides a significant "home" market for tourism which will allow the internal tourist infrastructure to be planned and developed. To enable this to take place it will be essential that:

- the Development Officer assumes a role in encouraging and guiding this activity;
- loans are made available, where necessary, for improvement in settlement accommodation;
- tourism requirements are taken into consideration in developing internal communications on the Islands; this could extend to the chartering of a small boat and/or use of the M.V. *Forrest*;
- steps are taken to establish a regime of control for tourists, particularly with respect to assessing the numbers of tourists that can visit wildlife sites without having an adverse impact upon the wildlife itself.

The development of the overseas tourist market will require sufficient capital to ensure that:

(a) the operation is properly managed and promoted—the British Tourist Authority have stated their willingness to promote the Falkland Islands in selected countries (initially USA, Canada, Britain, Switzerland and Germany) and establish links with appropriate tour operators;

*We do not include those Argentinians who used to visit the Islands for a day or more, chiefly to purchase luxury goods by taking advantage of lower duty or exchange rate anomalies.

(b) a suitable boat is bought/chartered for the Islands;
(c) at least three years of non-profit making operation are allowed for to take account of the slow build-up period for a new tourist area.

Clearly the operation should be designed for a small beginning but to plan for growth.

There is no reason why significant private finance could not be found for this operation, preferably with a reasonable share of Falkland Islands involvement, but previous experience is not encouraging. However, it is certain that the Falkland Islands Government, through a development fund, will also have to provide capital and operating subsidy in the initial years. Other potential sources of finance include the European Investment Bank, who previously indicated their willingness in principle to lend funds, and the Commonwealth Development Finance Corporation.

Once it is clear that tourists can be enticed to the Falkland Islands through an appropriately operated business, immediate steps to build a new hotel should be implemented—see below.

8.4. Cost and potential contribution to Falkland Islands' economy

Costs

If tourism is to succeed it must be properly financed. In the early years, the Government input would be substantial, and it is essential that finance for initiating an external tourist operation could in the initial years be of the following order of magnitude:

TABLE 8.4

Estimates* of external finance for tourist operation (£000s)

Year	*1*	*2*	*3*	*4*	*5*	*Total*
Capital/Operating subsidy	250	150	150	100	75	725
Hotel	—	250	500	250	—	1,000
Total	250	400	650	350	75	1,725

*These estimates can only be taken as broadly indicative.

In the Western Isles of Scotland, the Highlands and Islands Development Board have wholly financed hotel construction and rented the building under contract to an operating company. Experience would indicate that as the trade builds up, some return can be made on the investment. However, it is unlikely that in the initial years, more than a nominal rent of £10,000-20,000 could be charged for such a new hotel in the Falkland Islands.

The point should perhaps be made that if other development takes place in the Falklands, there will be a requirement for further hotel accommodation anyway.

Revenue

The eventual total tourist revenue potential, excluding air fares to the Islands, could be considered to be of the order of £250,000-400,000 a year assuming around 1,000-1,500 visitors a year, and double this figure if the Argentinian/South American market was included. Assuming a retention factor of around

45 per cent, this would indicate a net contribution to the GDP of around £120,000-180,000 a year at the lower level. To achieve a retention factor of even this relatively low level, it would be necessary to have some form of tourist tax levy, probably at the sites to be visited and at the airport.

In terms of jobs, it might eventually provide the equivalent of 20-30 new jobs, albeit that many of these would be part-time and temporary in nature.

The potential tourist contribution to the economy of the islands can best therefore be described as useful rather than a development sufficient in size to guarantee the future economic viability of the Islands in conjunction with wool production. Its attraction is that it offers organic growth of the economy which could be combined with and help to sustain the existing sheep farming activity on the Islands. The commercial opportunity is also real and immediate, provided particular constraints can be overcome.

SECTION NINE

WOOL AND SKIN PROCESSING

9.1. Background

9.1.1. Insofar as it potentially offers the means to add value to the primary product of the Falklands' economy, the processing of wool remains an important possibility. In 1976 we concluded that the primary stages, scouring and spinning, would be unlikely to be feasible for various economic and technical reasons, notably the over-large production capacity. Even the Yorkshire wool scouring industry, with lower energy costs than the Falkland Islands, finds itself uncompetitive today. The type of smaller spinning mill found in the Faroe Islands was not thought suitable for Shetland or Falklands wool.

However, it was believed that the use of yarn spun elsewhere would permit weaving and knitting projects, essentially at cottage level, though with central co-ordination. It is understood that some progress has since been made with a knitting project on this basis, and that Falklands products have been on sale in Port Stanley.

It has been put to us that if effectively all the Falklands wool clip were scoured and spun in the Islands on a co-operative basis, a viable project could result which might provide at least 100 jobs and significantly increase gross revenues. Another suggestion has been for an integrated slaughtering/meat-processing/fellmongering/scouring operation. Our caveats remain, but the interest and preliminary analysis which lie behind these suggestions may justify close examination.

9.1.2. Recent developments in spinning and knitting in Shetland

Our own preference is for an undertaking which would allow expertise to be developed gradually and be more consistent with local labour supply. This could be similar to a small integrated spinning and knitting project established in Shetland since our 1976 Report. It is close in size to the Faroese mills referred to above, and has now successfully completed its experimental phase.

Using ingeniously modified old equipment (some circa 1912), the partners in the venture have succeeded in spinning 100 per cent Shetland wool—previously regarded as problematical. Output is relatively small, and is appropriate to the amount of labour locally available. Scouring is done with home-made equipment. The yarn is knitted locally, using industrial hand-flat machines and home knitters/finishers, and high-quality jumpers are produced which command premium prices. The partners have now decided to expand the project by purchase of "new second-hand" equipment.

9.2. The potential opportunity in the Falklands

9.2.1. Scale of investment

The options on level of investment in an integrated spinning/knitting undertaking

of the order of scale we envisage are two, that is, that pursued and described above in the first phase of the Shetland project and that now intended there, using newer equipment.

The latter is not thought appropriate for the Falkland Islands, essentially for reasons cited in 1976. Its capital cost would be high (perhaps £500,000) and its capacity (2,000 lbs of finished yarn per week, equivalent to say 2,500 garments) would require about 60 full-time machine knitters and up to 300 home finishers. This scale of operations would assume skills and markets which are not currently available and could only be built up over time. Of course not all the wool need be knitted locally, but markets would have to be assured elsewhere before incurring the high capital costs involved. It has also to be borne in mind that in the Highlands and Islands, capital costs can be reduced by well over 50 per cent through aid from public bodies, for example, the HIDB and local authorities.

The alternative of modifying old machinery obtained at low cost, as in Shetland, would result in a scale of operations more appropriate to the Falklands situation. However, the feasibility of the operation will depend critically on the level of ingenuity for maintenance purposes, and commitment on the part of the Falkland Islanders involved.

9.2.2. Economics of operation

Basic cost figures might be as follows:

Equipment costs	
Machinery	£75,000
Buildings	£80,000
Other/contingencies	£25,000
Total capital	£180,000
Production (assuming classic Shetland-type garments)	
Finished yarn	450 lbs weekly
Garments	500-600 weekly
Value	£5,000-6,000 weekly or about £250,000-300,000 per annum
Employment*	up to 17 full-time jobs 60 home finishers (part-time)

*It is possible that with "chunky" knitwear—see 9.3 below—this figure could be somewhat less.

9.3. Marketing a Falklands style

9.3.1. In the 1976 Report we emphasised the importance of developing a distinctive Falkland Islands product if export marketing was ever to be achieved on any scale. A local knitting group has made some progress in this direction. A Falklands knitwear project might do better to avoid variants of the more finely made classic Shetland type of garment and concentrate at least initially on a heavier "chunky-knit". In addition to requiring somewhat less skill, production of this kind could take advantage of new-found public awareness of the Islands' rugged conditions, not least the climate. A distinctive name would also have to be sought, and advantage taken of the Falklands wool mark referred to in Section 6.6. Moreover, such a garment would require a greater weight of wool, reducing the number of knitters required to utilise spinning capacity. It would also be possible to employ machinery in the finishing process. Even at the

relatively small scale envisaged, labour is likely to be difficult to find from the indigenous population, particularly if work is available for women at the garrison or in projects such as fish-processing (though the latter may be regarded as less congenial).

9.4. Future action on wool processing

9.4.1. Closer examination of the scope for commercial spinning and knitting would be necessary, and should initially involve the recently appointed FIG Development Officer who is familiar with the Borders woollen industry. Account should be taken of constraints operating in the Falklands, including:

- the lack of traditional skills;
- the difficulty of maintaining machinery, particularly if second-hand, without ready access to spare parts and expertise;
- the problem of marketing at considerable distance, possibly exacerbated by an infrequent and/or unpredictable freight service. It should be noted that the knitwear trade is currently in a depressed state;
- the need to establish whether the necessary numbers and quality of labour could be found.

9.4.2. The Development Officer will be able to take into account local factors which bear on these constraints and on which we lack information. These include progress in the small knitwear project started since 1976, and the latest situation in regard to carriage of freight. He will need to be assisted in a co-ordinated fashion by someone in the UK, experienced in the knitwear industry, and who could undertake further market research, examining retailing problems etc.

9.4.3. There is a potential entrepreneur in the Falklands who should be involved at an early stage in the exploration work, and who should also be enabled to visit the Shetland project and other comparable undertakings in the UK. Training would clearly be necessary, and it is worth noting that a Shetland company has expressed tentative interest in employing knitters in the Falklands whom they would presumably be prepared to train. Such a possibility might be extended to a joint venture with a Falklands entrepreneur, and this could help to ease the marketing problem.

9.5. Sheepskin processing

9.5.1. The 1976 Report and a later study by the Tropical Products Institute* concluded that a commercial tannery would not be feasible in the Falklands in view of the small throughput likely, relative to the high capital cost. Both reports suggested production on a "cottage" basis might be feasible. Marketing would have been chiefly to tourists. An investigation into UK market opportunities was not encouraging.

**Report on a visit to the Falkland Islands*, J.R. Barlow, *13 October—4 November 1977*.

9.5.2. Although several small commercial processing plants producing sheepskin articles have been established in recent years (for example in the Highlands and Islands), using secondhand and/or improvised machinery, our conclusion is that an operation of this kind would be highly marginal in the Falklands. Capital investment would be hard to justify.

9.5.3. Fellmongering (skin pickling) was seen as another possibility and this should be explored further. It has been carried out in one or two farm-based units in the Falklands and might be expanded to more settlements or Port Stanley. From our discussions with the trade and consideration of the production and marketing economics, a large-scale fellmongering plant would not seem to be feasible.

SECTION TEN

ALGINATES

10.1. Resources and development potential

10.1.1. Growing around the coasts of the Falkland Islands are to be found large quantities of kelp (a giant seaweed) which are suitable for the extraction of alginic acid. From this substance a range of alginate salts can be produced which have wide industrial application as thickeners and stabilisers, mainly in the food and brewing, pharmaceutical, rubber, paper and textile industries. Its use as a stabiliser for fibre reactive cotton dyes, developed by ICI, resulted in a rapid expansion of the UK alginates industry in the late 1960s and early 1970s, with the result that the UK company Alginate Industries obtained an exclusive but renewable licence to harvest the kelp resources of the Falkland Islands.*

Kelp also occurs around South Georgia.

10.2. Change in situation since 1976

10.2.1. Since the mid-1970s, the outlook has altered in several important respects. The rise in oil prices and the world recession has caused a collapse in the textile market for alginates, partly as a result of stagnation in cotton products, together with a shift in the location of centres of manufacture to developing countries. There has also been a partial substitution of alginates themselves, which are energy intensive to extract and produce, by cheaper synthetic compounds. The result has been a fall in the total size of the alginates market by about 25 per cent since the middle 1970s.

10.2.2. During the same period, major new producers have come on to the world market: Iceland, Chile and China, all with substantial resources and cheaper sources of energy.

10.2.3. The combination of these developments has led to a very considerable excess (about 30 per cent) in world alginates manufacturing capacity which has led to a considerable rationalisation of the industry. Two or three Scottish plants have been shut down in the last five years.It is therefore improbable that the now much slower growth foreseen for alginates, with the Falklands kelp resources will be exploited to supply these traditional markets for another 15 years or so.

10.2.4. Notwithstanding the reservations expressed over the short to medium development potential of alginates, the prospect cannot altogether be discounted.

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*The Falkands weed has a relatively low solids content (high slime coding) compared to some kelp, which means that it requires twice as much water to process it. This is a particular disadvantage if energy costs are high.

10.3. New development

10.3.1. Shortly before the invasion, the Falkland Islands Government received an approach for a new exclusive kelp exploitation licence from an American entrepreneur and industrialist with previous experience of the alginates industry. His proposal involves obtaining a licence to harvest kelp, eventually up to a minimum wet tonnage of 350,000 tonnes a year after 11 years, for which the FIG would receive a royalty gradually increasing from 10-20 US cents per tonne, with a minimum of $5,000 a year on commencement of the agreement. Eventual royalty earnings could theoretically amount to $70,000 a year.

10.3.2. To carry out the harvesting, it was originally understood that the company would initially invest in two harvester ships, with a factory ship for extraction of the alginic acid. The company told the Team that its intention was to build an extraction plant on the Islands, which would initially employ 50-70 people, with the eventual workforce required being around 130. The total initial capital investment mentioned was $25 million, which in view of the operation proposed, involving processing, would seem a considerable underestimate.

10.3.3. In the face of the considerable competitive disadvantage of producing and exporting alginates from the Falkland Islands (high transport and energy costs, importation of process chemicals), the firm proposes that these can be overcome in part by co-production of some high value chemicals, and secondly by being granted total tax exemption for the operation. Also, to proceed with the investment, the company would not surprisingly require regular air communication links with the Islands and an ECGD-type political insurance cover for its investment.

10.3.4. It will be important to ensure that any new kelp harvesting licence agreement structure should:

(a) ensure that some minimum fee is received, regardless of tonnage extracted—we note that the fee proposed is some 50 per cent lower in real terms than that obtained from Alginates Industries in 1972; on the other hand the economics have deteriorated and this is a matter for negotiation;

(b) provide that the licence should lapse on non-payment of the fees, and also if no significant development has taken place after five years of signing the agreement; the latter provision would allow for re-negotiation or cancellation of the agreement and avoid the resources being tied up by a single company for future development;

(c) take account of the need to protect certain littoral zones of the Falkland Islands, at least on a seasonal basis, for reasons of conservation of marine fauna at critical times in the life cycle.

10.3.5. The question of whether tax exemption should be granted raises wider questions relating to fiscal policy on new development. These are discussed in Section 3.3.5, New company investment.

10.4. Conclusions

10.4.1. While every effort should be made to encourage the new proposed development— a more detailed project proposal is required to assess its real economic implications and potential—we remain of the view that its chances of commercial success are slim, even with some degree of tax exemption.

10.4.2. In view of the considerable economic and marketing obstacles to be overcome if such an operation is to be successfully established, it would be unwise to build major new infrastructure and housing to accommodate the development until the commercial feasibility of the project had been satisfactorily demonstrated.

SECTION ELEVEN

HYDROCARBONS

11.1 Potential

11.1.1. The Malvinas Basin

Since the time of the 1976 Survey, knowledge of the hydrocarbons potential of the Malvinas Basin, the major sedimentary basin of the region lying between the Islands and the Argentinian mainland, has advanced notably, although to a considerably greater degree on the Argentinian side. The whole basin has been seismically surveyed, including an extensive survey by BP in 1979, and drilling has taken place in the Argentinian sector. Altogether the drilling undertaken by three international oil companies under various contractual arrangements with YPF, the Argentine state oil company, has so far yielded some seven hydrocarbon finds, of which about half are believed to be natural gas. The most easterly of these were drilled by Esso in a 13-well programme about 100-125 miles offshore which revealed two finds, both uncommercial.

The general conclusion on the drilling and seismic evidence must be that the area has so far not lived up to initial hopes and expectations.* As we wrote in our last report, oil will have to be found in large deposits (probably not less than 1 billion barrels) in the further offshore areas of the Malvinas Basin in order to overcome the enormous development costs imposed by the water depths and the unpredictable and generally hostile weather. Natural gas, unless found close to shore, would probably not be developed this century.

11.1.2. Other offshore areas

The other potential hydrocarbon-bearing sedimentary basins include the Burdwood Bank to the south of the Islands, the Falklands Plateau to the east, and other sedimentary areas along the submerged eastward thrust of the Andean chain to South Georgia. This Cordillera, as it is known, then loops southwards and westwards through the South Orkneys, South Shetlands and Sandwich Islands, emerging as Graham Land (Antarctica Peninsula). There is a reasonable chance that hydrocarbon-bearing sedimentary basins are associated with this southern section of the Andean chain, the Weddell and Bellingshausen Seas off the Antarctic Peninsula perhaps being the most geologically prospective.

Knowledge of this vast area is very sparse, and no geophysical surveys aimed at assessing the presence of potentially hydrocarbon-bearing structures have been carried out east or south of the Falkland Islands. Generally it is believed that the sediments are thinner on the Falklands Plateau to the east of the Islands and that the area between the Falklands and South Georgia is not

*We would also reiterate the comment made in the 1976 Report that statements of the potential reserves of the Malvinas Basin as being 6-9 times those of the North Sea are quite without foundation or scientific support.

considered as one of great potential by the oil industry. However, it must be emphasised that current geological and geophysical knowledge is such that no reasonable assessment of hydrocarbon prospects is possible. What is certain is that water depths in most of this offshore area, together with the appalling weather conditions, are such that it is likely that world oil prices would need at least to double in real terms before the oil industry would even consider exploratory drilling. Any such drilling stage would have to have been preceded by a thorough geophysical survey, the results of which would need to be particularly encouraging in order to persuade the industry to invest in drilling. It is possible that any such exploration drilling would in part be serviced from the Falkland Islands, assuming that external communications and other support infrastructure were adequate.

The hydrocarbons potential of Antarctica is briefly discussed in Appendix Four.

11.2. Development

11.2.1. The Malvinas Basin

Until a political settlement is reached with Argentina, the oil industry will be unwilling to become involved with any further speculative geophysical exploration, let alone drilling of the Falkland Islands sector of the Malvinas Basin. It is not just a matter of military threat but the fact that the industry requires to have a reasonable stable political and licensing regime before it is prepared to invest the large sums of money required to explore in such areas.

Should some form of acceptable settlement be accomplished, it does not necessarily follow that an exploration base would be established on West Falkland. As noted in the 1976 Report, a well-developed oil exploration support infrastructure already exists in Patagonia, based on Comodoro Rivadavia. Initially at least, this would make any such service activity less likely in the Falklands. The adverse social and economic impact on the Falkland Islands of any large-scale development associated with the development and/or production phases of offshore oil were also described in the previous report and noted elsewhere in this one.

The possible realisation of any future economic benefit through exploration licensing arrangements or subsequent royalties/tax revenue is highly speculative. Among other things it would depend upon the nature of any political settlement concerning the Islands, which would of course include matters concerning rights to offshore resources.

11.2.2. Other offshore areas

One possible option for action with respect to the offshore sedimentary areas to the east and south of the Falkland Islands is the shooting of seismic lines from a suitably converted Royal Naval ship already stationed in or visiting the South Atlantic. As noted above, no geophysical survey aimed at delineating and assessing the possible existence of hydrocarbon bearing structures has yet been carried out. The Department of Energy estimate that the cost of such a survey, targetted to the most interesting areas, including the subsequent data processing, would be of the order of £5-10 million. There is reasonable prospect that some of this cost could be recouped in selling the results to oil companies.

Reasonable arguments for such an exercise could well be advanced in the context of improving scientific knowledge of the hydrocarbon prospects of the areas and taking sensible advantage of the presence of British ships. It is hard, however, to provide a solid justification in terms of possible contribution to the Falkland Islands economy over the next 10-15 years. In the event that a political settlement was established providing the necessary stable exploration regime for the region, it is likely that exploration efforts by the oil industry would be directed to the more economically attractive prospects of the Malvinas Basin, rather than the very high cost development offshore areas to the east and south of the Falklands.

SECTION TWELVE

TRANSPORT, INFRASTRUCTURE, ENERGY SUPPLIES AND PLANNING

12.1. External air services

12.1.1. Introduction

Apart from the difficulties arising from the complexity of aircraft performance calculations and requirements, this section of the report is written amid uncertainty and problems about several fundamental factors affecting the resumption of civil air links. We recognise that it may be difficult to obtain the consent of South American countries to the institution of a scheduled air service to the Falkland Islands in the aftermath of the hostilities. Furthermore, there are constraints on civilian aircraft operations imposed by the surfacing material of the repaired and extended runway at Port Stanley, and only a severely limited number of seats available for civilians on the current RAF Hercules flights from Ascension.

12.1.2. The need for air services

A regular air service with the Islands must once again be introduced if the Falkland Islands are to have a future beyond the short term. This is true for reasons of economic development and social welfare. For most of the development possibilities considered, particularly concerning natural resources and tourism, an air service is essential, and if one is not provided the morale of the Islanders will suffer.

Before the invasion an air service was provided at least weekly by LADE, the Argentine military airline, to Comodoro Rivadavia in Patagonia. Though the service had certain major drawbacks, of which the inability to book seats outside Argentina was the most restrictive, about 2,000 passengers a year used the airline, of which a survey revealed that business/government travellers constituted between 16 and 42 per cent. Even a limited air service did therefore generate some demand directly related to the Islands' economy and administration. A certain proportion visited Argentina and other South American countries for leisure, medical and higher education reasons, although the latter demand had largely disappeared; about 5 per cent or so of local residents travelled outside South America each year.

Future demands are difficult to quantify. It is considered unlikely that the demand for travel for social reasons will decline if a reliable air service is introduced, and it could well grow if it improves. On the other hand, it is possible that the demand for medical services outside the Islands will be somewhat less, if additional support to the local medical service can be provided by the garrison, although any such fall in passengers should be more than made up for by visits for rehabilitation and development purposes. Excluding military personnel, it is

therefore expected that demand for air services in the next two or three years would be 2,000-2,500 passengers per annum. Development and tourism could subsequently increase this figure to 3,000 or more passengers annually, that is, averaging around 15-20 a week in the winter and possibly 50-60 in the summer months.

12.1.3. The airport

Short term

The runway at Port Stanley is now being repaired, strengthened and lengthened to 7,100 feet with a UK Load Classification Number (LCN) of 45; the width however will be limited to 96 feet. By the end of September this will permit its use by military aircraft. The runway is to be equipped with side lighting and navigational aids more than adequate for civil aircraft. However, the surface is essentially a temporary one, with a cost-effective life limited to 2-2½ years.

Short-haul civil aircraft such as the HS 748, DHC DASH-7, F 27 or the new BAe 146, and medium-haul aircraft up to the size of Boeing 737 and DC 9, should be able to operate on this runway although operators would have to determine the level of loading advisable for safe operation. But the Civil Aviation Authority (CAA) advise us that since no civilian operator has yet acquired experience of the temporary surface, comprehensive tests will be required before they allow civilian services to use it. These should be carried out at the earliest opportunity.

Longer term

If air links are to be provided in the longer term, the limitation on the life of the temporary runway will require the construction of a completely new airfield, either at the present site near Stanley or elsewhere. The location, runway length and strength should have regard to both military and civilian requirements.

The length of runway can affect the potential for development. If it is too short to accommodate at least medium-haul jets the possibilities to rotate personnel such as fishing crews by air or to accommodate tourist charter flights would be limited. We **recommend** therefore that the runway be long enough to take flights to and from Uruguay and Brazil, and for this we believe 8,500 feet with an LCN of 50 would be adequate.

We are advised that this runway length (but not necessarily the LCN) would permit flights by aircraft such as a DC 10 from Ascension Island. Although such a route would not be an economic proposition as a regular service, its possibility as a fall-back could be important.

To cater for the eventuality in the very long term that developments in the area and in Antarctica might justify frequent links by wide-bodied jets operating long-haul routes, we **recommend** that the airport be constructed in a location and manner to permit eventual extension of the runway.

Consideration should be given in due course to establishing an airstrip in South Georgia, some 800 miles from Port Stanley. We understand that this would be technically feasible either near Grytviken or more probably at Salisbury Plain in the north west of the Island.

We are unable to give any estimate for the likely construction costs of an airport at Port Stanley with an 8,500 feet runway, which would vary considerably depending on location and terrain. Informed guesses have put the cost in the range of £30-35 million.

12.1.4. Service options

For the purpose of considering alternative air service options in the future, we have made the following assumptions:

- services to Argentina remain impracticable;
- her neighbours are however willing to co-operate in a service to and from Port Stanley;
- an aircraft operator would be able to divert to an Argentine airport in event of an emergency in accordance with normal practice;
- Argentina would honour its ICAO commitments and provide the necessary normal services throughout the Argentine Flight Information Region (FIR), which extends as far east as South Georgia.

On this basis we have considered three possible routings:

(a) a long-haul service direct from the UK via Ascension Island or Africa;
(b) a medium-length service to Uruguay or Brazil; and
(c) a feeder service to Chile.

Long-haul service

The route through Ascension or Africa would not be possible until a new airport was completed, but even then, it should be considered as a last resort to provide periodic (say three-monthly) charter flights. Its advantage would be freedom from dependence on the South American mainland for staging. But because of the great distances (sectors of 3,500 and 4,000 nautical miles), the use of large aircraft such as VC 10s, Boeing 707s, DC 10s or Tristars would be required. The carrying capacity of these aircraft is far too great for more frequent flights to be conceivable because of the very limited civilian traffic which could be generated. The route would offer poor connections to destinations outside Europe and would not meet the demand for traffic to South America at all. Finally we understand that present regulations do not permit normal civilian use of Ascension Island.

Medium-haul service

Services from Port Stanley to Montevideo (c. 1,000 nautical miles) or Rio de Janeiro (c. 2,000 nautical miles), need not pass through Argentine airspace although they would be within the Argentine FIR. From Montevideo onward connections are not good, being limited to two flights weekly to North America and seven to Europe. The city is not presently served by any British airline with scheduled flights. A route to Brazil would incur much higher operating costs, but would offer excellent onward connections. Rio is outside the range of several otherwise suitable aircraft—the DC 9 for example—but could, we believe, be served by some versions of the Boeing 737 although with reduced payload. The turbo-prop HS 748 could operate to Montevideo but not directly to Rio.

Feeder service

A short-haul feeder service could operate to Punta Arenas, Chile (499 nautical miles), where onward connections to Santiago are good with 18 flights weekly. Santiago is much better served by international flights than Montevideo, having direct services to five cities in the USA and to Toronto. There are 17 flights weekly to 11 cities in Europe, including London, two of which are operated by British Caledonian Airways. A wide variety of turbo-prop aircraft could operate to Punta Arenas including the Viscount, HS 748, DHC DASH-7 and F 27. But there are three disadvantages. First, for this feeder service to operate it would be essential to negotiate Argentine agreement to pass through their air space. Secondly, the time required to travel to London would be much longer (some 42 hours) than via Montevideo (20 hours). Thirdly, there is a higher incidence of bad weather. (We note that British Air Ferries have applied for a licence to operate to Punta Arenas, but they would require either a guarantee of traffic or a subsidy.)

12.1.5. Recommended service

From the limited information available and the traffic forecasts which can be made in the face of many uncertainties, we **prefer** the Punta Arenas route. It would offer minimum operating losses (see below), aircraft of suitable size for the available traffic loadings, a wide choice of onward destinations through Santiago, and the degree of reliability and regularity required in support of sound economic development.

The next best option would be a service to Montevideo. While onward connections are not good, the flights could be timed to avoid undue delay in transit and to connect with flights which are not routed onward—as many are—through Buenos Aires.

A recent study of fares for one-way flights between London and Stanley (as at June 1982) shows that London-Santiago-Punta Arenas-Stanley could cost £998 compared with £886 through Montevideo (the fare on the previous route through Buenos Aires and Comodoro Rivadavia was £884).

12.1.6. Aircraft types

From a preliminary examination we **conclude** that for a feeder service to Punta Arenas the HS 748 would be a sound choice: it is a well-established British aircraft, providing 48 seats at maximum payload (11,532 lbs) over the distance with full reserves. Its take-off and landing runway requirements at full load should be amply met at Stanley when the current temporary improvements are completed. The aircraft is well known in South America as it is operated by at least four airlines there, and there should be few problems with the availability of spares and skilled engineers. Operating once weekly in each direction, the aircraft would offer almost 5,000 seats annually and would be capable of dealing with any seasonable peaks and foreseeable traffic growth.

On the medium-length service to Montevideo the most economical aircraft with the required range would also be the HS 748. The aircraft could operate with only a slight payload penalty while maintaining essential services.

12.1.7. Operation

Aircraft utilisation will be low and there will be substantial operating costs and overheads. (Those airline operators who have expressed interest in establishing a service have said that some form of seat-contract will be necessary with HMG). Because it is unlikely that a service could recoup both capital and recurrent costs we recognise that a subsidy will be needed. We **recommend** that the FIG, in consultation with HMG, establish the level of service required and then seek proposals from commercial airline operators for that service, by entering into contract with FIG to provide a suitable type of aircraft with support/flight crews and maintenance personnel. The requirements would need to be reviewed as traffic develops, and the FIGAS will have a role to play.

12.1.8. Costs

In Table 12.1 we indicate flight times, payloads, operating and acquisition costs for three aircraft which would be suitable for services to Punta Arenas, Montevideo and Rio de Janeiro, and comparable figures for operations by a DC 10.

For our preferred service, assuming a single trip were charged out at around £70, the annual operating subsidy required could amount to £200,000-250,000 a year.

TABLE 12.1(a)

Estimated flight times, payloads, direct operating and aircraft acquisition costs for the Falkland Islands external air service

Aircraft	*Route*	*Round trip block time*	*Payload (passengers) each way*	*Round trip DOC*[1]	*Acquisition costs*[2]	
					New	*Half life*
HS 748-2B	Pt.Stanley-Punta Arenas	4 hrs. 40 mins	48	£1,700	£4m	£1·2m
	Pt.Stanley-Montevideo	9 hrs. 40 mins	40	2,850		
BAe 146 (100)	Pt.Stanley-Punta Arenas	3 hrs. 20 mins	82	£2,800	£6·7m	—
	Pt.Stanley-Montevideo	6 hrs. 05 mins	82	4,200		
B 737 (200)	Pt.Stanley-Montevideo	5 hrs. 35 mins	130	£4,850	£8·2m	£6·9m
	Pt.Stanley-Rio	9 hrs. 55 mins	80	8,280		
DC 10-30	Pt.Stanley-Rio	8 hrs. 55 mins	300+	£28,000	£32·2m	£14·6m
	Pt. Stanley-Ascension	15 hrs. 30 mins	300+	48,200		
	Pt.Stanley-Dakar	21 hrs. 20 mins	210	66,000		

Notes:

[1]Direct Operating Cost (DOC) excludes all fixed costs and passenger taxes, insurance, catering or handling costs, and includes crew salary element and navigation costs which are estimated at European levels.

[2]Acquisition costs are presented to give scale of costs.

[3]All costs are order of magnitude only.

Source: British Caledonian Airways.

12.1.9. Conclusions

- A regular, reliable external air service is essential for both economic and social reasons. The service must be instituted at the earliest possible date.
- On balance the preferred service would be to Punta Arenas in Chile which has good onward connections; but this would require the right to cross the airspace of Argentina.

- If Punta Arenas is not practicable, the service should operate to Montevideo and be timed to make the best use of rather indifferent connections.
- An economical turbo-prop aircraft, such as the HS 748, would be the best choice to either destination.
- The service should be provided by an airline under contract to FIG covering the provision of aircraft, flight crews and maintenance staff.
- The contract with the airline should also establish the basis for calculating the operating subsidy.

12.2. Sea freight

12.2.1. Current situation

Before the invasion all sea freight between the UK and the Islands was shipped on a small mixed cargo vessel, the *AES*, which visits Port Stanley four times a year. On three of the return trips, the wool clip is transported back to the UK. In 1981, the following cargo volumes were transported:

UK to Falklands (imported goods) . .	7,724m³
Falklands to UK	507m³ of wool
	21,225 skins
	2,075 empty drums
Argentina to Falklands	15,000 drums of fuel*
	Animal and human foodstuffs

The *AES* is operated by the Darwin Shipping Company, a subsidiary of the Falkland Islands Company. In the 1976 Study, we commented that FIC operated this vital service in the wider interests of the Islands and did not appear to exploit its monopoly position. More recently, a representative of the New Zealand Wool Marketing Board observed that the freight element of Falkland Islands wool costs was very reasonable. However, we are bound to note that the Darwin Shipping Company for the last three years has achieved net profits equivalent to around 15-17 per cent on turnover, a figure rivalled by few, if any, shipping companies today. It is probable, therefore, that FIC weights its freight cost recovery towards the outward shipment of goods, rather than the return transport of wool—perhaps this is not surprising in view of the fact that it produces over 40 per cent of wool shipped.

12.2.2. The future

If the Islands are to develop, it is probable that a more regular and perhaps more flexible sea freight service will be required. Consideration should therefore be given to the possible advantages of direct charter arrangements, for example with the St Helena Shipping Company, which operates the subsidised freight (and passenger) transport service to St Helena and Ascension Island as well as other Atlantic Islands. This company currently has the use of two cargo vessels in the 1,000-2,000 dwt range—one, the *St Helena*, can be used for passengers, and is currently in the Falklands, having been requisitioned by the MoD.

The Falkland Islands might well benefit from being part of the operation of a larger South Atlantic shipping company, with experience of serving island communities. Service could be more frequent; the ships have, for example,

*Fuel from Argentina was shipped by Argentine vessels.

greater freezer container capacity and they regularly visit African ports (a possible export market for fish, as well as a source of fresh fruit in the absence of Mar del Plata in Argentina). It is possible that the MoD would also wish to take advantage of such a service in supplying the garrison. Freight costs would seem to compare reasonably well with those of the Darwin Shipping Company, although those rates obtained for the St Helena vessels assumed fully loaded ships.

12.2.3. Future action

We **recommend** that a fuller exploration be undertaken of the possible advantages of linking the existing Island external freight service with that of the St Helena Shipping Company, with a particular mind to future developments on the Island. There may also be scope for co-ordinating some of the provision needs of the garrison with those of the Falklands, thereby offering certain economies of scale to costs of cargo freight to the Islands.

12.2.4. South Georgia

The Falkland Islands could have a role as staging post and forward base for the exploration and development of resources around South Georgia.

12.3. **Intra-islands communications**

12.3.1. General

In the absence of any road system on the Islands, before the invasion transport was provided by:

(a) *FIGAS, the Government run intra-island air service*—This operated one Britten-Norman Islander and two DHC Beaver float planes between Stanley and the settlements. This service was good but expensive.

(b) *Coastal Shipping Limited*—This consisted of a 221 ton cargo vessel, the *Monsunen*, which carried necessary goods and fuel to the settlements, and collected the wool clip and other agricultural produce. The service was operated by FIC for a consortium of farm owners on a non-profit making fee-paying basis. The main drawbacks to the service was its relative infrequency, its limited freezer capacity for carrying fresh produce and certain unsatisfactory design elements.

A good surface road, likely to cost around £1·8 million, is being built from Stanley to Darwin/Goose Green by an 18-man PWD team, and will be completed in 1984. This was a recommendation of the 1976 Report supported principally by arguments of the social benefits conferred in terms of increased social contact and recreational options; economic reasons are insufficient in themselves. The most difficult 20 km section of the road has almost been laid and there is already evidence of local people's enthusiasm for its existence.

12.3.2. Future development

Roads

The PWD envisages extending the road system in the Falkland Islands, once the Darwin road has been completed, to link the larger settlements of East and West Falkland. The capital cost of such a road development would be of the

order of £10-15 million, and the total road system would carry an annual maintenance cost of around £1 million a year. While it is probable that such a development would yield savings on the operation of the Islands' air service, it can be seen that the annual operating cost of maintaining a road system would increase FIG expenditure by some 45 per cent above its 1981 overall level.

We remain convinced of the social benefits of developing a road system. It is almost certain that its existence would also stimulate economic activity. However, recognising the high associated maintenance cost, we suggest that the road building programme be extended but with regular appraisals of costs and benefits as development of the system proceeds. Moreover, we believe that the emphasis and design of the road configuration should be geared to supporting small farm development (and other development projects) on the Islands, rather than simply be aimed at linking the main settlements.

A road development planning committee should in time be established, represented by the Director of PWD, the Chief Executive (if appointed), the Development Officer and suitable Camp representatives. It is hoped that over the longer term, the Corps of Royal Engineers in the garrison could provide invaluable assistance with road development.

In the short term, of course, it is envisaged that PWD and the Sappers will be concerned only with the repair of war damage and building of the new runway.

Other means of transport

The development of roads will undoubtedly affect the demand for the two other Island transport services: in particular the release of FIGAS capacity in summer could facilitate tourist visits to the more distant islands.

There is uncertainty about the future life of the *Monsunen* but it would have had to be replaced in the next five to ten years. Today, it is possible to purchase for around £2 million a multi-purpose small cargo/passenger vessel specifically designed for inter-island services and which can load or discharge onto a beach or concrete ramp. Such ships are larger and would have several advantages over the *Monsunen*. Equally their costs of operation would be considerably higher, possibly even prohibitive. At some point in the future, five to seven years ahead, a thorough appraisal of the future intra-island transport needs of the Falklands will be required, and such new cargo-carrying options will need to be explored in the context of development needs, the extension of the road network etc.

12.4. Harbours and jetties

12.4.1. Stanley

For the foreseeable future, Stanley harbour, in spite of its draught and size limitations, will remain the only port in the Falkland Islands, notwithstanding the use of Port William for oil tankers. It is understood the Royal Navy does not wish for its own needs to develop a new port, though if a civil justification could be found, it would undoubtedly wish to use an improved port facility. As discussed in Section 7.3.6.3, only if a major offshore fisheries development were to take place would a new port be justified.

However, within Port Stanley itself, the existing jetty system is in many ways unsatisfactory. The principal problems relate to the FIC jetty over which all the Islands' imported goods are handled and the wool is loaded. Apart from being

in rather poor repair, the FIC jetty can receive vessels with a maximum draught of 14 feet and its cargo handling operation is very slow and expensive.

Immediate consideration should therefore be given to building a new jetty out into the Stanley harbour, which would provide a 22-24 ft draught clearance and would have a crane capable of handling containers. The quay would need to have an associated storage warehouse (probably on land for fire reasons) and would have an area for stripping and stuffing containers. Our consultations would indicate the cost of such a new jetty and ancillary facilities would be of the order of £3-3·5 million, although maximum opportunity should be made to limit costs by using local materials, for example by building a stone/concrete causeway. In its design, full consideration should be given to minimising labour costs of handling.

It should be made clear that while no solid economic justification can currently be produced for the building of such a new jetty, it would afford the following advantages:

- quicken the turn-around time for the *AES*, the cargo ship supplying the Islands/transporting the wool;
- allow existing Polish trawlers and any British exploratory fishing vessels to be provisioned alongside;
- allow a greater range of ships to discharge and load directly;
- afford the means for efficient freezer container handling in the future.

The operation of any such new jetty would require expert management. This could be under the auspices of the Falkland Islands Development Agency (see Section 2.9), providing the correct training and right management had been appointed. Advice and even contracted expertise could be sought from a company such as James Fisher & Sons Limited of Barrow.

Like an extended runway, it should be seen as expenditure facilitating the future development of the Falkland Islands without of course guaranteeing that such development will take place. In the longer term, it would in any case be necessary to rebuild or conduct substantial renovation work on the FIC jetty.

12.4.2. Camp settlements

Through lack of maintenance and repair, the state of many of the Camp settlement jetties is very poor. Some have also been damaged by the war. It is possible that the introduction of more generous capital allowances since 1979-80 will encourage the necessary refurbishment and investment to take place. However, the FIG may also wish to consider the inclusion of jetties in a capital grants provision recommended for introduction as part of an agricultural production and improvement scheme—see Section 6.7.2.

12.5. Fuel supplies

12.5.1. Liquid fuels

Prior to the invasion, the Islands received their principal petroleum product, gas oil/diesel, from the Admiralty storage at Port William, which was regularly re-filled by visiting Royal Fleet Auxiliary (RFA) tankers. Other petroleum products including gasoline and Avgas for the Islands' air service were supplied by YPF, the Argentine State oil company. YPF had also built bulk storage in Stanley, which was not yet in use, as a means of receiving petroleum fuels direct

from tankers. Construction had begun on an oil jetty, to be jointly financed by HMG and Argentina. In view of the fact that supply of all fuels will presumably now be carried out by the Navy, it is unlikely that such an oil jetty should now be built in view of the fact that RFA tankers cannot tie up alongside it. Nevertheless, consideration should be given to what permanent facilities for receipt of petroleum products should be provided in the long term.

The Royal Navy will also now be providing aviation fuel for the military aircraft to be stationed at Stanley Airport. The option exists for this fuel to be either wide-cut Avtag fuel or the higher flashpoint aviation kerosene Avtur used by civil airlines. It is of the utmost importance that the military aircraft should operate on Avtur, so that the fuel system would also be suitable for supplying any civil air service based on the Islands.

The continuation of the Admiralty-supplied gas oil will mean that the economy of the Islands will continue to be fuelled by high priced energy—the retail price for gas oil/diesel is 78 pence a gallon compared to 41 pence a gallon in 1975-76.

12.5.2. Peat

Peat was in both the Camp and Stanley the principal domestic fuel for heating. As a result of the damage to and the presence of mines in the peat bogs, particularly of the Stanley Common, this traditionally cheap source of fuel may no longer be available to some. The use of coal, or other alternative energy sources, will add an extra inflationary element to the Falklands' economy.

Advantage should also be taken of recent advances in small-scale peat cutting machinery used, for example, in the Highlands and Islands.

12.6. Electricity supply

12.6.1. Stanley

Stanley has its own electricity supply system provided by some 1·3 MW of diesel fuelled generating capacity. Demand fluctuates considerably between a winter peak of around 1 MW to a minimum load requirement of about 200 kW. Even before the arrival of the garrison, rising demand was likely to necessitate additional capacity and plans were underway for installing a further 320 kVa diesel generating set. The garrison's power needs are very much more substantial than those of Stanley, and the ordering and transport of generators to meet their needs is already in hand. Nevertheless, it is recommended that future development of the Stanley power supply system should be undertaken on a joint civil/military basis so that any economies of scale can be realised. The development of mutton and/or fish freezing at Stanley would add to future power requirements, as could any further increase of the population.

12.6.2. Camp settlements

Diesel generators also provide the source of electricity supply in the Camp settlements, where some of the equipment is quite old. Electricity prices can be very high indeed—in some settlements, companies charge over 20 pence per kWh.

12.6.3. Scope for wind power

In the 1976 Report, we concluded that economic potential existed for the

installation of medium-size (6-10 kilowatts) wind generators in the Camp settlements linked to batteries. Since that time, diesel prices have risen further still but so too have the capital costs of wind generators with their ancillary inverter and other equipment. Such machines at Falklands' wind speeds will generate electricity at around 6-10 pence per kWh, assuming that power is required when it is available.* However, for the Falkland Islands' settlements, power generated from the wind would not match demand requirements very well (there are periods in the day when power is often switched off or demand is very low—see 1976 Report, Vol. 1, Chapter 13, section 2). As a fuel saver, therefore, wind generators would offer considerably more economic advantage in Camp settlements with some battery storage.

The other opportunity, not considered at the time of the 1976 Report, is in Stanley itself. In 1979, the Electrical Research Association reported on the feasibility† of the installation of a 1 MW machine in Stanley. In our view this was an inappropriate size for consideration and is very unlikely to be economic. The largest size for consideration should be of the order of 200-250 kW in order to maximise the load usage, remembering that in off-peak periods Stanley demand load drops to around this level.

Such sized wind generators are manufactured in the UK, and a 250 kW aerogenerator has been installed for the CEGB in South Wales. Assuming a similar machine were installed at Stanley, where average wind speeds are of the order of 9-12 metres a second, such a generator costing £500,000 to install would pay for itself in around 10-12 years at current gas oil/diesel prices. This is equivalent to a DCF rate of return of around 4 per cent, a not very attractive economic proposition. However, there are similar Danish and American manufactured wind generators which are some 40 per cent cheaper, which would make such a wind power system a more economically attractive prospect. We therefore **recommend** that the ongoing wind power feasibility study being conducted by the Cranfield Institute of Technology should fully explore the economic advantages of this option.

12.6.4. Hydro-, wave power, and peat fuelled generation

The 1976 Report also noted the potential scope for mini-hydro power projects on the Murrell River and at Port Howard in West Falkland, as identified in the Walker Report‡ of the mid-1950s, but concluded that it was only likely to be of possible economic potential on the Murrell River.

There also exists the potential for installing a 200 kW wave energy converter off Cape Pembroke for supplying Port Stanley. Such an installation—for example the oscillating water column system would seem to offer the best combination of economic and reliability considerations—might in the future be an economic proposition. However, wave machines, unlike wind turbines, have not yet been

*Wind turbines are normally justified on the basis of being energy savers, that is, by foregoing the need to burn expensive fossil fuel, rather than being cheap sourses of generating capacity. Wind is not a guaranteed source of energy supply, even in the Falkland Islands where the wind falls on most evenings.

†*Medium Wind Turbine Generators on Falkland Islands and St Helena*, Electrical Research Association, March 1979.

‡See Chapter 13, section 2, p 283 of the 1976 Report.

proven in performance. We would comment that while the location is certainly a good one for harnessing wave energy, the cost of setting up and monitoring the performance of a prototype 200 kW wave converter in the Falkland Islands would be very high compared with the cost of such an experiment off Scotland.

Finally we would draw attention to the existence of small-scale peat-fuelled thermal electricity generation sets (down to 20 kW even) which have been successfully operated in Finland. Larger units are common in Ireland. While it is generally true that small-scale thermal generators suffer from diseconomies of scale, depending on peat costs these may not be of overriding consequence and a 300 kW set could be purchased for around £300,000. We **recommend** that full consideration be given to this option in the future planning of Stanley's power supplies.

12.7. Physical planning and economic development

12.7.1. Economic development can take place in isolation with its location determined solely by entrepreneurial choice. Some developments are either resource-based or require specific physical conditions and these may have few, if any, options in location. Other developments may be less constrained and able to flourish in a number of places. Even though those locational choices reflect private requirements, much can be gained through co-ordination with public investment such as roads, piers, airstrips, water supply and sewage treatment plants. Physical planning can ensure that private and public investment is made in the right place and at the right time.

12.7.2. If economic developments of any significance take place, the settlement pattern in the Falkland Islands will inevitably require the provision of new or expanded settlements. Planning will be essential to identify suitable land for housing, retail, services and other provisions in convenient relationship to new industry. That land must allow the construction of streets, houses and utilities at reasonable cost and the opportunity for a good residential environment attractive to incoming workers. The physical planner will also have regard to the conservation of the natural environment and wildlife under the impact of new development.

In the longer term, should industry develop based on exploitation of offshore resources in or near Falklands waters, crucially important locational decisions will have to be made in which physical planning advice—possibly based on Scottish experience—will be vital. Finally, the need for planning at a smaller scale in regard to some aspects of establishing a garrison has already been mentioned.

12.7.3. It is **recommended**, therefore, that the service of a qualified physical planner, preferably with experience in islands or peripheral areas, should be available to FIG. The rate of development is likely to be such that the planning advice could best be obtained by the retention of a professional consultant, and that the Government office should be able to respond to such advice.

SECTION THIRTEEN

CONSERVATION

13.1. Background

13.1.1. Because of their geographical situation and their history, the Falkland Islands and their Dependencies possess a range of natural resources and artefacts of industrial archaeology which, if not making the Islands unique in the world, certainly mark them as places of special interest in a global context. The attractions as far as tourists are concerned were briefly noted in Section 8.1. But the general point to be made is that as we stated in the 1976 Report, " . . . development should proceed in a manner which takes proper account of the natural resources of the Islands. This is necessary not only to conserve the flora and fauna of the Islands and their waters for their natural and scientific value, but also to ensure that resources are exploited in ways which are of maximum long-term economic benefit to the Islands".*

13.1.2. There is a new urgency for taking positive action on conservation of the Falkland Islands' resources, precipitated by the potential environmental consequences of military action in the battle to repossess the Islands, and by the future presence on the Islands of a garrison involved in training exercises.

13.2. Resources at risk

13.2.1. The Falkland Islands

It is not within the scope of this study to attempt to list the principal natural resources of the Islands, although there would be considerable merit in having such a systematic ecological inventory. However, it is worth drawing attention to certain key aspects to illustrate the need for formulating an integrated conservation policy and for having expert advice.

Most, but not all, of the distinctive flora and fauna of the Falklands derive from the marine and littoral habitats of the Islands. These lend special conservation significance to many of the small islands, the shore and immediate offshore areas of the Falkland Islands. One might mention in this regard the importance of preserving, indeed of restoring, the tussac grass areas of the Islands.

Also, the peat bog itself is not as ecologically robust as one might think. In order to protect the peat bog from wind erosion, the cutting of peat on the Islands is subject to certain laid-down guidelines. There is an urgent need over the next 6-18 months to attempt to restore the bog or take appropriate action to prevent permanent damage to pasture being caused by the digging of trenches, gun emplacements etc. Particularly affected and sensitive are the areas around Stanley and Cape Pembroke.

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*Vol. 2, pp 85-86.

Lastly, attention is worth drawing to the maritime heritage of Britain, Canada and the United States in the form of hulks and wrecks around the Falkland Islands of what have been described as "the finest collection of square rigged ships in the world". Public interest was raised some 12 years ago with the salvage of Brunel's S.S. *Great Britain* and her return to Bristol and restoration. It is desirable that at least one of these ships should be restored and remain in the Islands as a reminder of the Islands' former importance as a port of call and repair base for whaling and sealer ships, and for ships sailing between the east and west coasts of North America before the construction of the Panama Canal.

13.2.2. South Georgia

The wildlife of South Georgia is even more spectacular than that of the Falkland Islands, though probably not as diverse.

Also on South Georgia are the remains of ships, harbours, docks and processing plants from the days when it was the centre of the world's whaling industry, as well as the buildings and church of the whaling communities, principally Norwegian and British.

13.3. Environmental protection and conservation

13.3.1. Existing ordinances and further legal protection

Designation of protected areas comes under three relevant Ordinances presently in force in the Falkland Islands and Dependencies. Two Ordinances, the Wild Animals and Birds Protection Ordinance 1964 and the Nature Reserves Ordinance 1964, respectively authorise the establishment of "wild animal and bird sanctuaries" and "nature reserves". Some of each have already been designated, but both these Ordinances have important weaknesses. Wild animal and bird sanctuaries are generally applicable only to the protection of animals and birds and not to the protection of habitats. Nature reserves protect habitats, but cannot be established on private land without the consent of the owner. Because there is no system of compensation for landowners who suffer financial loss from the restriction on land use imposed by nature reserves, all reserves so far established have been on Crown land. In the light of these weaknesses and the changing circumstances in the Falklands, both Ordinances may need to be reviewed. The third Ordinance, the Falkland Islands Dependencies Conservation Ordinance 1975, authorises the designation of "specially protected areas", "sites of special scientific interest" or "areas of special tourist interest" in the Islands' Dependencies. At least one area in each category has now been established.

Consideration should also be given to designation of parts of the Falklands as wetlands of international importance under the Convention on Wetlands of International Importance Especially as Waterfowl Habitat. In its instrument of ratification, the UK expressly applied the Convention to the Falkland Islands and Dependencies. Sites may be designated unilaterally by the UK.

13.3.2. Environmental protection committee and advisory/research agency

In the 1976 Report, we recommended that the practical implementation of environmental protection in the Falkland Islands should involve the establishment of:

(a) on the Islands *an Environmental and Resource Management Committee.*
The Committee made up of representatives from the conservation and economic interests in the Islands and at least one member of the Legislative Council would give guidance and establish priorities in terms of action on all matters concerning the conservation of the environment. It would need to have a *permanent Scientific Adviser,* responsible for data collection, identification of issues etc., and who could co-opt other ecologists and expert assistance as necessary. He would also need to be familiar with the management of wildlife tourism. The permanent adviser need not be based permanently in the Falklands, but would obviously be a regular annual visitor, often for extended stays.

(b) in the UK *a Falkland Islands Scientific Research Agency.*
The purpose of this Agency would be to co-ordinate and advise on all natural and social scientific research and environmental monitoring in the Falkland Islands. It would also act as a clearing house for information on the Islands and, through the appointed permanent Scientific Adviser, assist where possible the Environmental and Resource Management Committee. The Agency would have represented on it appropriate scientific and conservation experts from different fields, and it was suggested that its relatively modest budget might be met by NERC, administratively based with one of NERC's constituent bodies.

We **stand by and restate these recommendations** as being, if anything, of greater importance today than they were in 1976.

13.3.3. Scope

We have already noted the need to draw up an ecological inventory of the Falklands with the intention of recommending priorities for special protection. However, in designating areas of wildlife sanctuaries and nature reserves, it is important that the interests of tourists are taken fully into account. Thus, for example, while the King Penguin rookery at Volunteer Point may not be of particular importance in a global context, nor is it an endangered species, its importance to the Falklands as a tourist attraction is very considerable.

It is important that at the earliest opportunity ground rules for military exercises are drawn up with respect to "no-go" areas, for example important tussac growing areas, and to operational activities such as trench digging, shelling and other disturbance of the physical environment. Equally, every opportunity should be given to the garrison to visit areas of wildlife interest. This can only serve to heighten their awareness of the issues.

Licences for tourist operators should exactly define their obligations with respect to environmental protection, code of conduct etc.

Finally with regard to South Georgia, in view of its industrial archaeological importance, there would be great benefit to be gained from a visit by an expert from a maritime museum or industrial archaeologist, who would recommend what could and should be preserved, and if so, how and where. This is to ensure that account is taken of these matters in any future development on South Georgia.

13.3.4. Hydrography

Opportunities could well be taken of the presence of suitable Royal Navy ships to update and improve hydrographic data on the whole area.

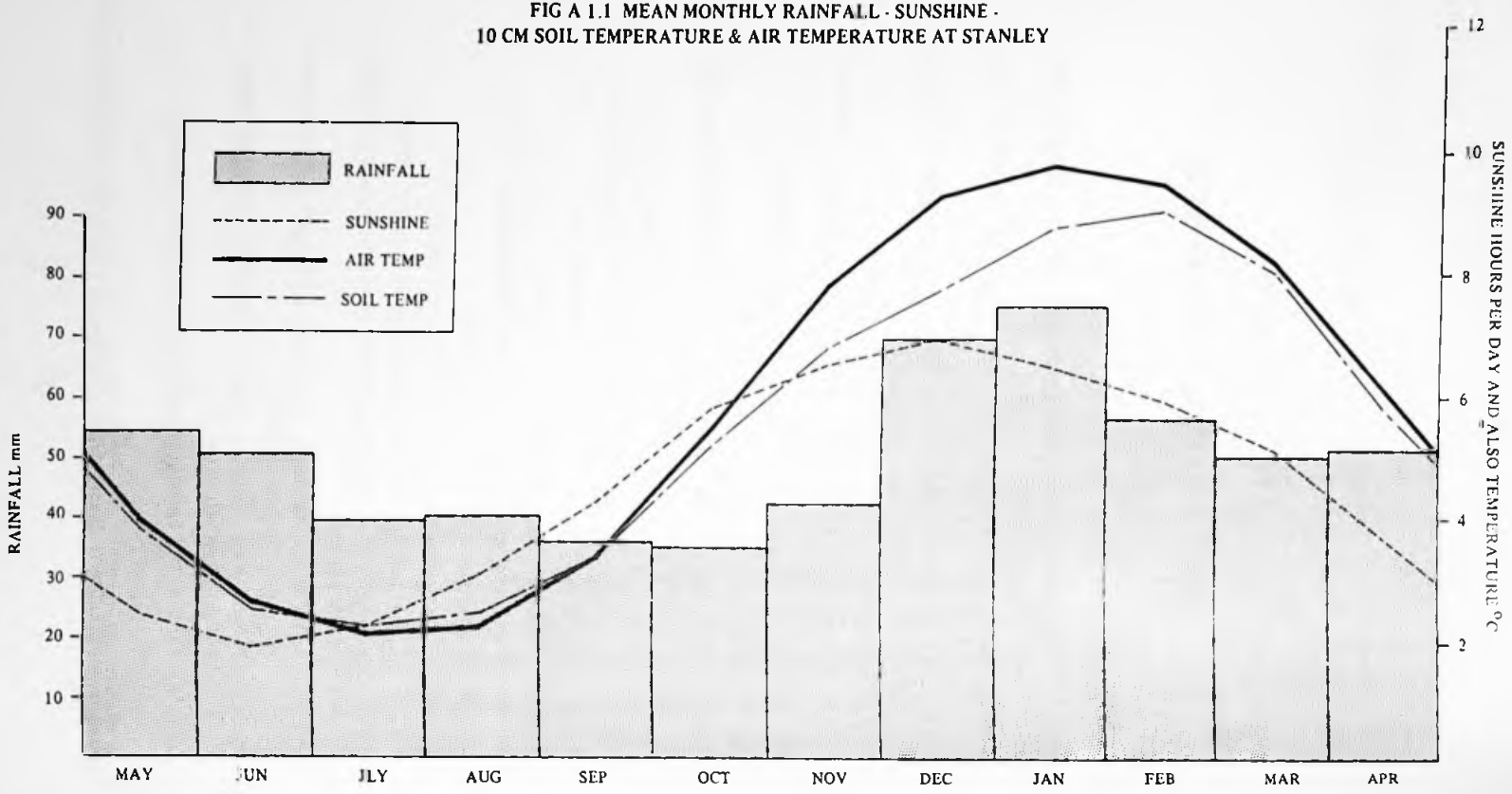
APPENDIX ONE

AGRICULTURAL STATISTICS*

Table of Contents

*The assistance of Caroline Walker (The Royal Veterinary College) is gratefully acknowledged.

FIG A 1.1 MEAN MONTHLY RAINFALL - SUNSHINE -
10 CM SOIL TEMPERATURE & AIR TEMPERATURE AT STANLEY



Source: GTU

TABLE A1.1
REGIONAL VARIATION IN WOOL PRODUCTION 1976-78 (1) and 1979-81 (2)

Location	Sheep shorn ('000)		% change	Total clip ('000 kg)		% change	Average fleece weight (kg)		% change
	(1)	(2)		(1)	(2)		(1)	(2)	
The Islands	62·8	61·8	−1·59	260·4	262·2	+0·69	4·15	4·21	+1·45
East Falkland	327·7	342·4	+4·49	1,174·8	1,195·7	+1·75	3·59	3·47	−3·34
West Falkland	188·8	193·4	+2·44	706·3	700·4	−0·85	3·74	3·62	−3·21
Colony	573·5	597·5	+4·18	2,141·0	2,158·2	+0·80	3·73	3·61	−3·22

TABLE A1.2
DISTRIBUTION OF FARMS ACCORDING TO NUMBER OF SHEEP SHORN 1980-81

Location and Type	% of sheep shorn	Total farms	< 1,000	< 5,000	< 10,000	< 15,000	< 20,000	< 30,000	< 50,000	< 75,000	> 75,000
East Falkland	57·4	21	2	7	3	2	2	3	—	1	1
West Falkland	32·3	7	—	—	—	—	1	3	3	—	—
The Islands	10·3	13	2	6	3	2	—	—	—	—	—
FIC Farms*	44·0	7	—	—	1	1	—	2	1	1	1
Total Farms		23				13			5		
% of Farms		56·1				31·7			12·2		
% of Sheep		13·3				43·0			43·7		

*Included in above three locations.

TABLE A1.3

FALKLANDS WOOL QUALITY

Fibre Diameter (Microns)	22-26	26-28	28
Staple Length (mm)	70	80	90
Predominant Breed Type	Polwarth	Corriedale	Romney
Type of End Use	Speciality white tops Worsted	Woollen woven apparel fabric Shetland	Blended knitwear Hand knitting yarns
Proportion of Colony Clip (%)	40	45	15

TABLE A1.4

LIVESTOCK POPULATION OF FALKLAND ISLANDS 1974-75 AND 1980-81

	1974-75	1980-81	% *Change*
Sheep	644,014	650,130	+1·0
Cattle	9,462	8,092	−14·5
Pigs	28	52	+85·7
Horses	2,754	2,301	−16·5
Dogs	856	821	−4·1
Poultry	2,399	2,192	−8·6

TABLE A1.5

SHEEP NUMBERS AND OUTPUT 1965-66 to 1980-81

Year	*Total sheep*	*Sheep shorn*	*Total wool clip*	*Average fleece weight*
			(*'000 kg*)	(*kg*)
1965-66	638,165	566,568	2,198·2	3·88
1966-67	627,367	567,959	2,089·0	3·68
1967-68	620,932	559,802	2,047·6	3·66
1968-69	635,236	565,807	2,108·8	3·73
1969-70	628,690	570,678	2,096·6	3·67
1970-71	637,359	568,996	2,075·2	3·65
1971-72	634,163	573,401	1,981·4	3·45
1972-73	612,508	564,776	2,003·2	3·55
1973-74	628,147	553,285	1,990·5	3·60
1974-75	644,014	565,631	2,138·3	3·78
1975-76	644,819	580,724	2,239·9	3·86
1976-77	638,116	564,143	2,073·9	3·68
1977-78	648,366	575,567	2,109·7	3·67
1978-79	659,012	591,388	2,123·7	3·59
1979-80	663,367	607,306	2,218·1	3·65
1980-81	650,130	593,889	2,112·4	3·56

TABLE A1.6
THE STRUCTURE OF THE FALKLANDS FLOCK

	Rams %	*Breeding ewes* %	*Cast ewes* %	*Maiden ewes* %	*Wethers* %	*Hoggets* %
1966-70	1·4	35·5	1·0	9·0	33·0	20·1
1971-75	1·3	34·9	1·7	8·8	33·1	20·2
1979-81	1·1	33·6	2·5	9·1	34·0	19·7

AVERAGE LAMBING—"AT MARKING"

	1966-70	1971-75	1979-81
ISLANDS	68·8	69·1	65·6
EAST FALKLAND	63·6	64·1	62·4
WEST FALKLAND	61·7	60·8	61·3

TABLE A1.7
AVERAGE ANNUAL NUMBER OF SHEEP SHORN AND TOTAL CLIP PER FARM* FOR 1976-78 (1) AND 1979-81 (2)

Location & Type of farm	*No. of Sheep shorn* (1)	(2)	*% change*	*Total clip (kg)* (1)	(2)	*% change*
SMALL ISLANDS	1,796	1,653	−7·96	8,301	7,548	−9·07
LARGE ISLANDS	9,012	8,531	−5·33	37,624	37,170	−1·21
EAST FALKLAND						
Small farms	1,570	1,474	−6·1	5,196	5,156	−0·78
Medium farms	9,849	10,154	+3·1	35,189	34,779	−1·16
Large farms	36,832	38,632	+4·89	131,946	134,976	+2·3
WEST FALKLAND						
All farms	26,971	27,623	+2·42	100,906	100,047	−0·85

*For farms listed in Table A1.8.

TABLE A1.8
FARM PERFORMANCE FOR 1976-78 (1) AND 1979-81 (2)

Location & Farm	*No. of Sheep shorn* (1)	(2)	*Total clip (kg)* (1)	(2)
ISLANDS				
SMALL				
Carcass	1,904	1,936	8,830	9,012
Sedge	943	865	3,765	3,478
Sea Lion	1,594	1,564	8,104	7,620
New	2,365	1,919	11,385	8,921
West Point	2,175	1,982	9,420	8,709
Keppel	—	2,900	—	12,096
LARGE				
Speedwell	10,983	10,134	51,832	50,924
Weddell	9,687	8,517	37,165	34,247
Saunders	6,367	6,943	23,874	26,339
Pebble	—	13,133	—	48,248
WEST FALKLAND				
Fox Bay East	25,056	26,621	102,468	99,913
Fox Bay West	26,506	26,929	96,224	93,714
Port Howard	34,666	34,824	126,161	131,529
Hill Cove	32,421	32,212	121,338	114,987
Roy Cove	17,913	16,307	77,112	69,552
Chartres	25,228	26,806	95,921	97,146
Port Stevens	27,006	29,658	87,122	93,487
EAST FALKLAND				
SMALL				
Moody Valley	2,774	2,485	9,344	8,694
Sparrow Cove	840	835	3,795	4,173
Mullet Creek	1,097	1,101	2,449	2,601
MEDIUM				
Rincon Grande	8,268	7,907	32,039	29,544
Port Louis	9,778	9,662	35,048	33,748
Bluff Cove	2,514	3,316	7,938	8,709
Berkeley Sound	13,265	14,450	45,874	47,779
Salvador	15,419	15,436	55,037	54,114
LARGE				
Port San Carlos	27,307	28,476	105,205	101,380
San Carlos	23,087	24,393	87,001	84,732
Teal Inlet	19,311	19,127	66,573	63,973
Douglas	14,032	14,101	44,044	42,714
Fitzroy	78,276	80,605	78,276	80,610
North Arm	59,440	61,956	208,883	211,952
Darwin	93,001	99,527	333,638	359,478

TABLE A1.9
AVERAGE ANNUAL PERFORMANCE* FOR 1976-78 (1) AND 1979-81 (2)

Location & Type of farm	*Average fleece weight (kg)*		*Wool per acre (kg)*		*Acres per sheep shorn*	
	(1)	(2)	(1)	(2)	(1)	(2)
SMALL ISLANDS	4·62	4·57	2·64	2·40	1·77	1·90
LARGE ISLANDS	4·17	4·36	0·81	0·80	5·16	5·45
EAST FALKLAND						
Small farms	3·31	3·50	0·98	0·97	3·39	3·62
Medium farms	3·57	3·43	0·83	0·82	4·29	4·16
Large farms	3·58	3·49	0·73	0·74	4·93	4·71
WEST FALKLAND						
All farms	3·74	3·62	0·65	0·64	5·80	5·67

*For farms listed in Table A1.10.

TABLE A 1.10
FARM PERFORMANCE FOR 1976-78 (1) AND 1979-81 (2)

Location & Farm	*Average fleece weight (kg)*		*Wool per acre (kg)*		*Acres per sheep*	
	(1)	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*
THE ISLANDS						
SMALL						
Carcass	4·64	4·65	2·08	2·12	2·23	2·19
Sedge	3·99	4·02	4·44	4·10	0·90	0·98
Sea Lion	5·08	4·87	3·71	3·49	1·37	1·39
New	4·81	4·65	2·38	1·87	2·02	2·49
West Point	4·33	4·40	2·59	2·40	1·67	1·83
Keppel	—	4·17	—	1·25	—	3·33
LARGE						
Speedwell	4·72	5·03	1·70	1·67	2·78	3·01
Weddell	3·84	4·02	0·47	0·44	8·13	9·25
Saunders	3·75	3·79	0·79	0·87	4·75	4·36
Pebble	—	3·67	—	1·15	—	3·21
EAST FALKLAND						
SMALL						
Moody Valley	3·37	3·50	1·09	1·01	3·09	3·45
Sparrow Cove	4·52	5·00	1·31	1·44	3·45	3·47
Mullet Creek	2·23	2·36	0·54	0·57	4·12	4·11
MEDIUM						
Rincon Grande	3·88	3·74	1·25	1·15	3·10	3·24
Port Louis	3·58	3·49	0·93	0·45	3·86	3·91
Bluff Cove	3·16	2·63	0·20	0·22	15·99	12·12
Berkeley Sound	3·46	3·31	0·94	0·98	3·69	3·39
Salvador	3·57	3·51	0·94	0·92	3·81	3·81
LARGE						
Port San Carlos	3·85	3·56	1·08	1·04	3·58	3·43
San Carlos	3·77	3·47	0·80	0·78	4·69	4·44
Teal Inlet	3·45	3·35	0·54	0·52	6·40	6·46
Douglas	3·14	3·01	0·33	0·32	9·58	9·54
Fitzroy	3·62	3·53	0·76	0·79	4·73	4·49
North Arm	3·51	3·42	0·63	0·64	5·59	5·37
Darwin	3·59	3·61	0·89	0·96	4·02	3·75
WEST FALKLAND						
Fox Bay East	4·09	3·75	0·72	0·70	5·59	5·36
Fox Bay West	3·63	3·48	0·59	0·57	6·21	6·11
Port Howard	3·64	3·78	0·73	0·76	4·99	4·97
Hill Cove	3·73	3·57	0·83	0·78	4·53	4·56
Roy Cove	4·31	4·27	1·03	0·93	4·16	4·57
Chartres	3·80	3·62	0·58	0·59	6·53	6·15
Port Stevens	3·23	3·15	0·38	0·41	8·48	7·72

TABLE A1.11
RANGE OF FARM PERFORMANCE 1979-81

	Average fleece weight (kg)	*Wool per acre (kg)*	*Acres per sheep*
SMALL ISLANDS	4·02-4·87	1·25-4·10	0·98-3·33
LARGE ISLANDS	3·67-5·03	0·44-1·67	3·01-9·25
EAST FALKLAND			
Small farms	2·36-5·00	0·57-1·44	3·45-4·11
Medium farms	2·63-3·74	0·22-1·15	3·24-12·12
Large farms	3·01-3·61	0·32-1·04	3·43-9·54
WEST FALKLAND	3·15-4·27	0·41-0·93	4·56-7·72

TABLE A1.12
LEVELS OF PERFORMANCE ON THREE WEST FALKLAND FARMS

	Sheep shorn	*Total wool clip ('000kg)*	*Average fleece weight (kg)*	*Acres per sheep*
HILL COVE				
1956-60	27,226	96·6	3·55	5·40
1961-65	27,588	103·6	3·76	5·33
1966-70	29,529	107·6	3·64	4·98
1971-75	30,765	110·9	3·61	4·78
1976-78	32,421	121·3	3·74	4·53
1979-81	32,212	114·9	3·57	4·56
ROY COVE				
1956-60	14,358	58·4	4·07	5·19
1961-65	15,628	66·8	4·28	4·77
1966-70	18,912	78·6	4·15	3·94
1971-75	18,860	79·0	4·19	3·95
1976-78	17,913	77·1	4·31	4·16
1979-81	16,307	69·6	4·27	4·57
PORT HOWARD				
1956-60	30,954	126·5	4·09	5·59
1961-65	33,214	133·2	4·01	5·21
1966-70	34,223	124·4	3·63	5·06
1971-75	34,227	119·9	3·50	5·06
1976-78	34,666	126·2	3·64	4·99
1979-81	34,824	131·5	3·78	4·97

TABLE A1.13
TOTAL NUMBER OF FARM EMPLOYEES

Location & Type	*1975*	*1978*	*1981*	*% change 1975-81*
ISLANDS	38	43	36	− 5·3
EAST FALKLAND	197	202	190	− 3·6
WEST FALKLAND	125	105	105	−16·0
FIC FARMS	138	144	150	+ 8·7
COLONY	360	350	331	− 8·1

TABLE A1.14
AVERAGE ANNUAL OUTPUT OF WOOL PER EMPLOYEE (kg)

Location	*1971-75*	*1976-78*	*1979-81*
LARGE ISLANDS	4,620	6,270	6,969
EAST FALKLAND			
Small farms	1,536	1,799	2,109
Medium farms	5,155	6,945	6,864
Large farms	5,155	6,444	6,313
WEST FALKLAND			
All farms	4,788	5,805	6,143

TABLE A1.15
GROSS RETURNS PER ACRE* FROM FALKLANDS WOOL, 1966-81

Year	*Weight (kg)*	*Value** (p)*
1966	0·87	39·2
1967	0·83	31·5
1968	0·81	32·4
1969	0·84	34·4
1970	0·83	30·7
1971	0·82	26·2
1972	0·79	43·5
1973	0·80	58·4
1974	0·79	87·7
1975	0·85	44·2
1976	0·89	79·5
1977	0·82	95·0
1978	0·84	96·6
1979	0·84	105·3
1980	0·88	100·8
1981	0·84	104·2

*Adjusted acre.

**1976-80 Colony average; 1981—average of 11 farms.

TABLE A1.16
RANGE OF COST FOR THREE FARMS WITH AN AVERAGE OF 30,000 SHORN SHEEP (PENCE/KG WOOL)

	1975	*1979*
GROSS WOOL PRICE	54·0-56·0 (low price)	124·6-124·7 (high price)
WAGES & SALARIES	20·4-26·0	33·3-50·9
MATERIALS	10·6-15·4	17·9-21·5
PRODUCTION COSTS	48·9-52·9	75·4-96·8
Ranges in proportion of production costs	*1970-74*	*1974-81*
WAGES & SALARIES	51·6-61·5	44·6-58·3
MATERIALS	18·5-20·6	18·5-29·5

TABLE A1.17
LIVESTOCK AND THEIR IMPORTED FEEDSTUFFS REQUIREMENTS FOR A POPULATION OF 4,000

	Consumption of retailed foodstuffs per capita per annum in UK (kg)	*Quantity required by a population of 4,000 (tonnes)*	*Estimated yield per animal (kg)*	*Number of livestock required*	*Imported feedstuffs for livestock (tonnes)*
BEEF	20·2	80·0	200·0	400	90
MUTTON	6·6	26·4	18·0	1,500	
PORK	12·7	50·8	55·0	100 (breeders) 1,000 (fatteners)	400
POULTRY	13·4	53·6	1·5	36,000	150
BACON/HAM	8·6	34·4			
OFFAL	3·7	14·8			
FISH	7·3	29·2			
MISCELLANEOUS	0·1	0·4			
BUTTER	8·1	32·4 } 210,000			
CHEESE	5·5	22·0 } gals.			
MILK	25·25 gals.	117,000	750 gals.	156	210
EGGS	15 doz.	60,000 doz.	200 eggs	3,600	200

TABLE A1.18
NUMBER LIVESTOCK BEFORE (1978-80) AND AFTER (1981) SUBDIVISION AT GREEN PATCH

	Breeding ewes	*Wethers*	*Sheep shorn*	*Total clip ('000 lbs)*	*Average fleece weight (kg)*	*Cattle*	*Poultry*	*Swine*
1978-80 (average)	3,435	6,736	15,045	123·9	3·73	296	125	6
1981 (Total of 6 farms)	6,857	7,351	17,491	135·6	3·52	285	157	16

TABLE A1.19
GRANTS AND SUBSIDIES AVAILABLE TO THE BRITISH FARMER

The grants and subsidies currently available are listed below:

Grants for production groups
Grants for forage groups in less favoured areas
Improvement of Houses and Cottages
Small Woods Scheme
Hill Livestock Compensatory Allowances
Agriculture and Horticulture Grants Scheme 1980 (Investment Grant)
Agricultural and Horticultural Development Scheme
Grants for the Improvement of Farm Structure
Grants for Training and Education

Source: At The Farmer's Service 1981/82, MAFF

Some items, on which grant may be paid under the Agriculture and Horticulture Grants Scheme 1980, and the rate of grant applicable to less favoured areas, are listed below:

Provision, replacement or improvement of:	
— field drainage and ditching	70 per cent
— roads, bridges, culverts, jetties or slips	50 per cent
— shelter belts	50 per cent
— pens, dips, fences, walls, gates	50 per cent
Re-seeding, application of lime or fertiliser	50 per cent
Clearance and reclamation of land	50 per cent

APPENDIX TWO

ESTIMATED COST ASSESSMENT OF A MEAT EXPORTING SCHEME

Export of mutton—estimated cost assessment

The following assumptions are made:

- A pre-fabricated, low-cost abattoir would be built, capable of handling 200 head per day.
- Sheep would be slaughtered, carcasses prepared, chilled and stored in a relatively small 50 tonne cold store—in fact somewhat too large for the requirement, but other opportunities for utilisation of the cold store may exist.
- Animals could only be made available for slaughter three and a half months of the year, and it is assumed that half of the 21,000 sheep (including some wethers) currently dumped would be of suitable quality—this is probably optimistic.
- Contract labour would be hired (mostly having to be imported) for the slaughtering season, four people plus one full-time supervisor of the abattoir/cold store. These personnel would have to be of sufficient skill to satisfy EEC regulations.
- A qualified vet would have to be imported to certify that slaughter was carried out according to EEC standards.
- Each sheep would yield 40lbs of carcass.
- The carcasses would be moved from the Islands in 15-20 tonne freezer containers. The *AES*, the current Darwin shipping vessel supplying the Falklands, has two such containers on its deck.

Capital costs	
Abattoir/processing facility	£75,000
Chiller/freezer	30,000
Cold store	50,000
Civil works/water supply/ancillaries*	15,000
Total	£170,000
Annual amortisation at 5 per cent over 20 years	£13,600
Operating costs	
Power at 8p per kWh	£7,000
Contract labour (including expenses)	23,000-28,000
Permanent labour	6,000
Vet	7,000
Other materials, water, etc.	1,000
Total	£44,000-49,000

*We have not included the costs of an effluent treatment plant (about £60,000-80,000), which in all probability would be required.

Combined annual capital and operating cost	**£57,600-62,600**
Unit cost of slaughter, preparation & freezing	14-16p/lb
Handling cost in Stanley	2p/lb
Transport cost to UK	10p/lb
Handling cost in UK	2p/lb
∴ Total abattoir to UK costs	28-30p/lb

The value for such carcasses in the UK is around 30-35p/lb.

It should be noted that these costs include nothing for the cost of moving sheep to the abattoir, nor any return for the farmers. It is to be expected that these would not be less than 5-7p per lb. Moreover, if the number of animals presented for slaughter were less than the number assumed in the calculation above, unit costs could rise very sharply.

It can therefore be seen that even on the relatively optimistic assumptions made above, the economics of the operation would appear highly marginal.

APPENDIX THREE
FALKLAND ISLANDS GOVERNMENT REVENUE AND EXPENDITURE 1973/74-1981/82
(£'000—CURRENT PRICES)

		1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
REVENUE										
I	Aviation	30	38	39	16	37	48	68	86	98
II	Custom	69	101	100	110	120	131	168	150	180
III	Dependencies' contribution to cost of Central Administration	5	10	10	15	15	15	27	27	30
IV	Fees and Fines	17	19	20	23	34	42	57	42	48
V	Harbour	24	30	33	36	41	56	122	148	183
VI	Investments	105	46	203	239	162	244	311	347	222
VII	Internal revenue	238	422	621	378	552	696	1,076	783	597
VIII	Miscellaneous	33	49	41	44	60	123	90	63	115
IX	Municipal services	63	98	117	151	147	125	182	190	248
X	Posts and Telecommunications	87	108	69	117	295	251	232	245	573
XI	Reimbursements	15	14	20	12	25	39	49	61	66
XII	Reimbursements from HMG	22	—	46	2	102	71	26	138	96
XIII	Rents	9	9	11	11	13	16	20	18	22
TOTAL		717	944	1,330	1,154	1,603	1,857	2,428	2,298	2,478
EXPENDITURE										
I	The Governor	14	19	24	24	33	34	35	39	42
II	Agriculture	3	3	4	7	7	9	11	16	28
III	Aviation	49	72	104	74	137	153	278	349	284
IV	Customs and Harbour	30	27	36	40	38	53	43	73	57
V	Education	78	98	122	134	150	186	196	236	256
VI	Medical	72	91	109	160	175	211	236	247	270
VII	Meteorological	5	6	7	10	12	14	14	21	18
VIII	Military	2	3	14	3	9	4	3	10	8
IX	Miscellaneous	12	101	32	17	28	58	33	56	41
X	Pensions and Gratuities	28	45	32	33	59	38	49	87	78
XI	Police and Prisons	11	14	17	18	22	25	30	41	36
XII	Posts and Telecommunications	63	81	77	81	157	152	179	214	280
XIII	Public works	73	97	126	133	174	189	225	276	303
XIV	Public works recurrent	53	61	75	98	150	137	170	229	244
XV	Public works special	4	6	34	57	13	42	41	54	51
XVI	Secretariat, Treasury and Central Store	66	84	115	142	138	203	192	245	184
XVII	Overseas passages	25	33	57	71	70	92	78	153	115
XVIII	Social welfare	9	29	16	17	23	59	79	89	76
XIX	Supreme Court and Legal	4	6	5	9	16	13	21	30	29
XX	Training	—	—	—	3	6	8	9	11	11
TOTAL		601	876	1,006	1,131	1,417	1,680	1,922	2,476	2,411

Source: FIG estimates.

Note: 1981/82 figures are estimates, 1980/81 and 1977/78 are revised estimates, others are actual.

APPENDIX FOUR

MINERAL RESOURCES IN BRITISH ANTARCTIC TERRITORY (BAT)

A4.1. Introduction

The Antarctic Treaty Area lies south of Latitude 60°S. The treaty may be reviewed after 1991.

During the past five years both claimant and non-claimant states have become particularly interested in the onshore and offshore mineral potential of Antarctica. More recently, discussions have taken place on a minerals regime under the Antarctic Treaty. It is therefore important for the UK to have a good knowledge of the mineral potential of BAT. The fundamental geological and geo-physical research programmes of the British Antarctic Survey (BAS) should provide a basis for both hydrocarbon and metallic mineral assessment.

A4.2. Offshore hydrocarbon prospects

A4.2.1. Falkland Island Dependencies

Limited geophysical work by the University of Birmingham Marine Geophysics Group in the Scotia Sea and surrounding areas has revealed the presence of a deep sedimentary basin to the north of South Georgia, but its thickness and extent have not yet been completely delineated.

A4.2.2. British Antarctic Territory

Cretaceous sediments are known to occur in the James Ross Island area off the north-east coast of the Antarctic Peninsula. A certain amount of stratigraphical and structural work has been done by BAS on the sediments in this area but thus far no positive conclusions have been reached on their hydrocarbon potential. There is some similarity between these sediments and those of southern Patagonia and Tierra del Fuego which are known to be oil bearing. Similar Cretaceous successions are known to occur along the east coast of the Antarctic Peninsula and they are believed to extend eastward beneath the Larsen Ice Shelf. A submarine sedimentary basin on the south side of the South Orkney block may once have been continuous with the James Ross Island basin before the formation of the Scotia arc in late Cenozoic times. The east coast of the Antarctic Peninsula is at present being investigated more thoroughly by BAS.

On the east coast of Alexander Island there is a thick Jurassic-Cretaceous sedimentary sequence, but on metamorphic and structural grounds it is unlikely to be oil bearing. To the south-west, the continental shelf of the Bellingshausen Sea has recently been explored by the Japanese National Oil Corporation but results are not yet available.

The continental shelf at the head of the Weddell Sea and beneath the Ronne and Filchner Ice Shelves is believed to be formed of sediments which could be

a potential source area for hydrocarbons. Parts of the eastern Weddell Sea have been geophysically explored by the FRG using seismic profiling techniques. Although these results are available, they have not yet been completely analysed. The BAS Weddell Province project, which will ultimately complete a geophysical survey of the ice shelf area at the head of the Weddell Sea and the hinterland, should produce useful results.

All of the marine areas discussed above are subject to the many problems of sea-ice formation, limited access due to pack ice, and the hazards of iceberg movement. Nevertheless, if the hydrocarbon potential of BAT is to be determined, further geophysical research both on land and at sea is essential.

A4.3. Onshore minerals

A4.3.1. Falkland Islands Dependencies

A detailed geological survey of South Georgia has been completed by BAS, but no traces of metallic minerals were discovered. If minerals are likely to be found in South Georgia, the most probable locations would be in the south-eastern complex which is extremely difficult of access due primarily to the high relief.

The South Sandwich Islands are a young volcanic island arc with several still-active volcanies. No metallic minerals have been found in this group so far, and it is unlikely they will be discovered there.

A4.3.2. British Antarctic Territory

The South Orkney Islands are mainly a metamorphic complex with deformed sediments in the eastern islands. There are no major igneous intrusions with which metalliferous minerals may be associated.

The South Shetland Islands and the Antarctic Peninsula form a geological environment in many ways similar to that of the South American Andes. There are many locations where porphyry copper mineralisation, similar to that of Chile, has been discovered in the Jurassic volcanic rocks, but the overall extent has not yet been delineated. Both copper and molybdenum minerals occur in this association. To determine the precise extent and degree of this mineralisation, shallow core drilling would be a useful technique. According to the work of Professor D. D. Hawkes (University of Aston in Birmingham), copper and molybdenum mineralisation may be associated with possible major fracture zones which are transverse to the trend of the Antarctic Peninsula and extend seawards.

The core of the Antarctic Peninsula is formed by basic to acid intrusions of batholithic dimensions. One might expect to find mineralisation in the roof regions of these intrusions where volatiles have penetrated the country rocks. However, the deep level of erosion has removed the roof rocks in many places, and so far no extensive mineralisation has been found in this particular environment.

Inland from the south-eastern head of the Weddell Sea a stratiform gabbro intrusion forms the Dufek Massif. Nickel, cobalt, platinum, manganese, uranium and tin mineralisation has been recorded here in trace amounts during geological work by the Americans.

Coal deposits, of an age similar to those associated with the Karroo sediments of South Africa, occur in the Theron Mountains. Coals are widespread in the Transantarctic Mountains and in parts of eastern Antarctica where they are buried by the Antarctic ice sheet.

A4.4. Conclusions

While there is a reasonable probability that hydrocarbons exist in certain offshore areas of Antarctica, and shows of coal and other minerals have been found onshore, there is insufficient evidence to make an overall prognostication over the minerals potential of the Continent. In the case of hydrocarbons, the exploitation technology has not been developed to deal with the enormous problems of iceberg movement. The environmental factors associated with minerals exploitation would be very substantial, and the overall costs of exploitation so high that it is unlikely that they would be considered for commercial exploitation until well into the next century.

It is a question open to debate as to whether the Falkland Islands would have a role in any future exploration and development of Antarctic minerals. Tierra del Fuego is nearer and more developed. South Georgia is of more relevance in this respect.

APPENDIX FIVE

TERMS OF REFERENCE OF AND LORD SHACKLETON'S INTRODUCTION TO THE 1976 REPORT

Terms of Reference

In the light of the weakening of the colony's economy and the decline in population, and taking into consideration previous reports including those of Theophilus, Armstrong, Comben/Waller and Davies:

1. To examine the resources of the colony and the dependencies and the prospects for economic development with particular reference to agriculture, the wool industry, the need for diversification and possible developments in oil, minerals, fisheries, and alginates and to make recommendations.
2. In this context to examine the present fiscal structure and the provision of government services in the colony and dependencies in the light of the present uncertain economic climate and to make recommendations. To advise on priorities for capital expenditure over the next five years with particular reference to the need for improved infrastructure and to programmes for public utility development and housing.
3. To assess the financial, manpower and social obligations of any recommended economic strategy, with particular reference to the encouragement of small-scale enterprise and scope for local investment, and the extent to which all these needs can be met from local resources and to the degree which recourse to all potential external resources may be necessary.

Introduction by Lord Shackleton to 1976 Report

I would like in this introduction to draw attention to certain of the issues that confronted us in our Economic Survey of the Falkland Islands and to identify the major considerations and constraints which we have had to bear in mind in arriving at a strategy for the future economic development of a group of islands half the size of Wales, with a population of less than two thousand, about 7,500 miles away from the United Kingdom. It is also right, at the outset, to dispel any reputation of the Falkland Islands, dating back to Dr Johnson, as "bleak" or "barren". Bleak they may be to some people, but they possess a charm for those who enjoy the wide vistas of sea and landscape, typical of Shetland or the Outer Hebrides, windy hills and sunshine, a fascinating wild life, and a friendly, hardworking and hospitable people.

Almost from the day that my fellow team members and I embarked upon our task, we have been made very aware of the degree of interest on the part of many people who are concerned for the future of the Islands. Indeed, we have received much valuable advice. It quickly became apparent to us that we were very far from being the first survey to study the Falklands. Over the last fifty years there have been many studies and reports (see Bibliography at the end

of the Report) which have included agriculture, fisheries, fiscal policy, the Government service and education—to name but a few. I am reminded of a definition from a member of our team with experience of the Highlands and Islands of Scotland of an island as "a piece of land entirely surrounded by advice". However, most reports contained good advice, although many of the recommendations have never been implemented.

This Survey differs in a number of respects from its predecessors. First, it was intended to provide an overall, indeed synoptic, examination of the Falklands' economic prospects in all sectors, and the recommendations (Chapter 19) are presented with a plan of action for their implementation, as well as a broad estimate of their financial implications. The Terms of Reference of the Survey were therefore very wide. It was right that they should have been so. In any assessment of the development prospects of the Falkland Islands, a comprehensive approach is necessary, not only to ensure that possibilities are not overlooked, but in order to achieve a balanced development strategy.

Secondly, we soon realised that to assess properly the development potential of the Islands it would be essential to take into account the social influences. A decision was therefore taken to interpret our Terms of Reference in the widest possible sense and, in effect, to make it a socio-economic survey. Indeed, we found the social dimension crucial to our work. We were conscious, too, that in interpreting these various social factors, we inevitably had to make judgements of a kind which could not be supported by firm statistical evidence. We are well aware that we have touched on sensitive issues and have reached conclusions, some of which may be unexpected, but whose significance we were all agreed was fundamental to any future strategy for the Falkland Islands.

A major aspect of our Survey which must be clearly recognised is that the Report has been prepared by a team wholly independent of Government, and while obviously we have sought advice from all quarters, our recommendations are entirely our own. Furthermore, the Terms of Reference excluded any matters relating to the political future of the Falkland Islands and their Dependencies, and the Survey had to be conducted on the assumption that their political status would remain the same as during the past one and a half centuries. Nonetheless, the hopeful development in international affairs which has led to regional co-operation between different nations is as relevant to this part of the world as to other areas where economic co-operation has been achieved. It is logical therefore that in any major new developments of the Islands' economy, especially those relating to the exploitation of offshore resources, co-operation with Argentina—even participation—should, if possible, be secured. The sovereignty issue overhangs our Report, as it does the Falklands, and the absence of a settlement could well inhibit the full development of the Islands. This does not, of course, diminish the fact apparent to any visitor to the Islands that the population is British and, as was forcefully impressed upon us whenever the subject was discussed, is firm in its desire to remain British.

There was one further consideration which we bore in mind at all times when we were studying the various possibilities for economic development. This was the need to have due regard to conserving the natural environment of the Falkland Islands and the Dependencies, with their surrounding waters.

I would now like to point briefly to one or two important conclusions that emerged from our Survey. The Falkland Islands' economy has suffered historically from a lack of local investment and a continual flow of private funds out of the Islands to the United Kingdom. The transfer of company funds alone over the last twenty years has amounted to over £5 million in current prices. A result of this has been that the UK Exchequer has substantially benefited from tax, on both the profits and private dividends remitted to the UK.

It is against this economic background, as well as the evaluation of the resource potential of the Islands, that we have put forward recommendations for a development programme which will call for certain UK expenditure, capital and recurrent, over the next five years (see Chapter 20). The major item is the extension of the runway of the new airfield, without which any substantial new development would, in our judgement, be greatly handicapped.

I have commented earlier on the lack of implementation of the recommendations of previous reports. It is our view that a main reason for this was the absence of the appropriate sort of government machinery. We are of the opinion that no major long-term economic development can take place without the provision of the right kind of institution within the government machine. In saying this, we do not wish to reflect on the existing administration of the Falklands. The Secretariat and other government departments have struggled manfully in providing an astonishingly wide and diverse range of services—in fact most services which would normally be the responsibility of central and local government—and it is a tribute to their officers that they have done so. I should note that, in considering our proposals for the strengthening of the government machine, we have had regard to developments in local government machinery in the United Kingdom and have received advice from local authority experts.

Our recommendations also have some constitutional implications. While the constitution was not directly within the Terms of Reference of this Survey, the changes in government organisation which we regard as vital to the implementation of our recommendations do involve constitutional change. Our principal recommendation is the establishment of the post of Chief Executive, who would be directly responsible to the Governor in Council: a post which would replace the present office of Chief Secretary. We have also recommended that the Governor, who is appointed by the Foreign and Commonwealth Office and who, in our opinion, carries a heavy and lonely burden of responsibility, should be assisted by a Political Adviser: a post to be filled by a Diplomatic Service officer who could deputise for the Governor in his absence.

But it is the post of Chief Executive which we regard as crucial to the implementation of our proposals. While he would be responsible for many of the existing policy functions of the Chief Secretary, he would be charged with the major responsibility for development across the whole spectrum of economic and social activity. He would need to be able to relate his responsibilities as the senior government servant, under the Governor, with the priorities associated with the development programme.

It is necessary to emphasise the difference between the role of Chief Executive and that of the Political Adviser. Whereas most diplomatic career posts are for limited tours of duty (of the order of two or three years), we are concerned that

the Chief Executive should be appointed for a longer period. Ideally, he should be a man of wide administrative experience, for example in local government or industry who, when appointed, should have sufficient authority and status to implement a development programme, and to function particularly in the field of business and economic negotiation in a role not dissimilar to that of a present-day local authority Chief Executive, for instance in Shetland.

While we believe that the Government, through the appointment of a Chief Executive—suitably supported—has a major part to play, it must be recognised that much of the impetus for the implementation of our recommendations will have to come from the people of the Falkland Islands. There must therefore be determined efforts to secure their participation and involvement through changes in the economic and social structure of the Islands. Success will in the last resort depend upon the response and commitment both of individual Islanders, and of the companies operating in the Falklands. There must be some correction of the failure to reinvest in the Islands by companies (referred to in the Report), a phenomenon which is not recent and can only to some extent be attributed to political uncertainties.

I must comment briefly on our method of working. We soon became very conscious that to produce a comprehensive report—in effect a national study—on the basis of just over four months' work was clearly very ambitious, all the more so since six weeks of that time was spent in the field or at sea. Furthermore, I was required, along with our Fisheries expert, to visit the dramatically beautiful Dependency of South Georgia which involved a further week at sea. While we were on the Islands each one of the settlements and farms (see map opposite Page 2 of the Report) was visited by one, and in most cases several, members of the team, nearly all by Beaver aircraft. I was myself able to land and spend some time at over thirty of the thirty-six farms. Between us we certainly met the majority of the population, either individually or in small groups, and gathered an enormous amount of information.

In the processing and presentation of the wide range of subjects covered, time has not always allowed a consistency of style to be achieved in the Report. We took a decision to give a comprehensive account of the resources and activities of the Islands, and opinions relevant to them, so that the reader would be properly informed as to the basis of our recommendations. Also, we felt it important that there should be reference material, particularly in those areas where we have judged it necessary to recommend that further work be carried out.

In putting forward our recommendations we may have done less than justice to the work and achievements of many people, especially previous Governors. Nor, filled as we all were with a sense of urgency on behalf of the Falkland Islands, have we acknowledged the extent to which many of our recommendations were the fruit of earlier studies. We are very grateful to a large number of people who have contributed to our work.

Our thanks go first of all to the Falkland Islanders themselves—managers, officials, shepherds, handymen—the people of Stanley and the people of the farms—for their kindness and their willingness to help in every way. I must also stress the total co-operation we received from the Governor and the Councillors, and too, the Secretariat on whom we made heavy demands. I would thank

the Falkland Islands Company, from whom we also received the fullest co-operation. If we have criticisms of any of these bodies, such criticisms should not be considered in isolation from their record of achievement.

We feel a special gratitude to the Royal Navy, to the Captain and Ship's Company of HMS *Endurance* who were responsible for much of our somewhat complicated sea-transport arrangements including the visit to South Georgia, and especially to the helicopter crews. We are similarly very grateful to the Captain and Ship's Company of the Royal Fleet Auxiliary *Tidesurge*. Mention should be made of the Islands' marvellous air service, whose two pilots flew us almost daily in fair weather or foul, and our thanks go also to the British Antarctic Survey and the Falkland Islands Committee.

I would like to thank those in the Foreign and Commonwealth Office and other government and local government bodies who helped with our arrangements, and express particular gratitude to the Highlands and Islands Development Board for their willingness to second their Social Research and Development Officer to our mission, thus rounding off in a crucial area the composition of our team.

There are so many other bodies and individuals to whom one would wish to make acknowledgements, that the list would be endless. In conclusion I must, however, express my own thanks to all the members of my team, an immensely hard-working and, I believe, very happy group of people.

MAY 1976

Printed in England for Her Majesty's Stationery Office by Robert Stockwell.
Dd201653 C40 9/82

SOUTH ATLANTIC OCEAN

BRAZIL

PERU

BOLIVIA

PARAGUAY

CHILE

ARGENTINA

URUGUAY

ANGOLA

ZAMBIA

ZIMBABWE

NAMIBIA (SW AFRICA)

BOTSWANA

MOZAMBIQUE

SOUTH AFRICA

Scotia Sea

Drake Passage

Antarctic Peninsula

Antarctic Treaty Area

Antarctic Circle

Distances in nautical miles

Falkland Is. (Port Stanley) to:

United Kingdom (Portsmouth)	6778
Ascension	3379
St Helena	3271
Rio de Janeiro	1856
Montevideo	1010
Comodoro Rivadavia	517
Punta Arenas	487
South Georgia (Grytviken)	786
Graham Land (Deception I.)	684

South Georgia (Grytviken) to:

Graham Land (Deception I.)	910

FALKLAND ISLANDS

WEST FALKLAND

EAST FALKLAND

SOUTH ATLANTIC OCEAN

JASON ISLANDS

PASSAGE ISLANDS

KING GEORGE BAY

QUEEN CHARLOTTE BAY

WEDDELL ISLAND

SPEEDWELL ISLAND

PEBBLE ISLAND

SAUNDERS ISLAND

LAFONIA

NO MAN'S LAND

LIVELY ISLAND

BLEAKER ISLAND

Byron Sound

Port North

Port Purvis

Middle Bay

Foul Bay

Grantham Sound

Berkeley Sound

Choiseul Sound

Lively Sound

Low Bay

Port Louis

Port San Carlos

Teal Inlet

Port Howard

Fox Bay

Port Stephens

Hill Cove

Cove

Carcass I

Westpoint I

Keppel I

Sedge I

Wreck Is

Steeple Jason

Grand Jason

Flat Jason

South Jason

Dunnose Head

Spring Point

Shallow Harbour

Chartres

Goring

Swan Islands

Tussac Is

Sea Lion Islands

Beauchêne I

Calista I

Wolfe I

Ruggles I

Great I

Seal I

Motley I

Large I

Triste I

Sea Dog I

Bird I

Rabbit I

Hummock I

Quaker I

North I

New Island

Beaver I

Penn I

Staats I

Fox I

Middle I

Barren I

George I

Annie I

Blind I

Eddystone Rock

Cape Dolphin

Cape Meredith

Cape Orford

Cape Tamar

Cape Bougainville

Cape Carysfort

Cape Pembroke

Rookery Bay

Mackinlay Head

Volunteer Pt

Strike Off Pt

Bombilla Point

Darwin

Goose Green

Walker Creek

Lively Settlement

Douglas Settlement

Salvador Settlement

Rincon Grande Settlement

Johnsons Harbour Settlement

Green Patch Settlement

Bluff Cove Settlement

Fitzroy Settlement

Teal Inlet Settlement

San Carlos Settlement

Port Howard Settlement

Fox Bay East Settlement

Fox Bay West Settlement

Port Stephens Settlement

Hill Cove Settlement

Cove Settlement

Carcass I Settlement

Westpoint I Settlement

Saunders I Settlement

Keppel Settlement

Pebble Settlement

North Arm Settlement

Speedwell I Settlement

Bleaker Settlement

New Island Settlement

Beaver Settlement

Weddell Settlement

Chartres Settlement

Dunnose Head Settlement

Spring Point Settlement

Stanley

Government Islet

Pebble Islet

Eddystone Rock

Cape Dolphin

Cape Tamar

Cape Bougainville

Cape Carysfort

Cape Pembroke

Rookery Bay

Mackinlay Head

Volunteer Pt

Strike Off Pt

Bombilla Point

Darwin

Goose Green

Walker Creek

Lively Settlement

Douglas Settlement

Salvador Settlement

Rincon Grande Settlement

Johnsons Harbour Settlement

Green Patch Settlement

Bluff Cove Settlement

Fitzroy Settlement

Teal Inlet Settlement

San Carlos Settlement

Port Howard Settlement

Fox Bay East Settlement

Fox Bay West Settlement

Port Stephens Settlement

Hill Cove Settlement

Cove Settlement

Carcass I Settlement

Westpoint I Settlement

Saunders I Settlement

Keppel Settlement

Pebble Settlement

North Arm Settlement

Speedwell I Settlement

Bleaker Settlement

New Island Settlement

Beaver Settlement

Weddell Settlement

Chartres Settlement

Dunnose Head Settlement

Spring Point Settlement

Stanley

SETTLEMENT POPULATION

- LARGE: 35 plus
- MEDIUM: 16 to 35
- SMALL: 15 or less

Land over 2000 feet
" 1500-2000 "
" 1000-1500 "
" 500-1000 "
" below 500 "

Heights in feet

Scale 1: 643,000

Miles 5 0 5 10 15 20 Miles

Roads

Tracks

Telephone Lines

Lighthouse, Beacon ..... L · Bn

ALL TERRITORIAL WATERS ARE SEAL RESERVES

61°00' 60°30' 60°00' 59°30' 59°00' 58°30' 58°00'

51°00' 51°30' 52°00' 52°30'

Longitude 60°30' West of Greenwich

Published by Directorate of Overseas Surveys D.O.S. 908A

Agents for the sale of this map are:- Edward Stanford Ltd., 12/14, Long Acre, London, W.C.2. Price Code 4
Copies can also be obtained from Colonial Secretary's Office, Stanley, Falkland Islands.

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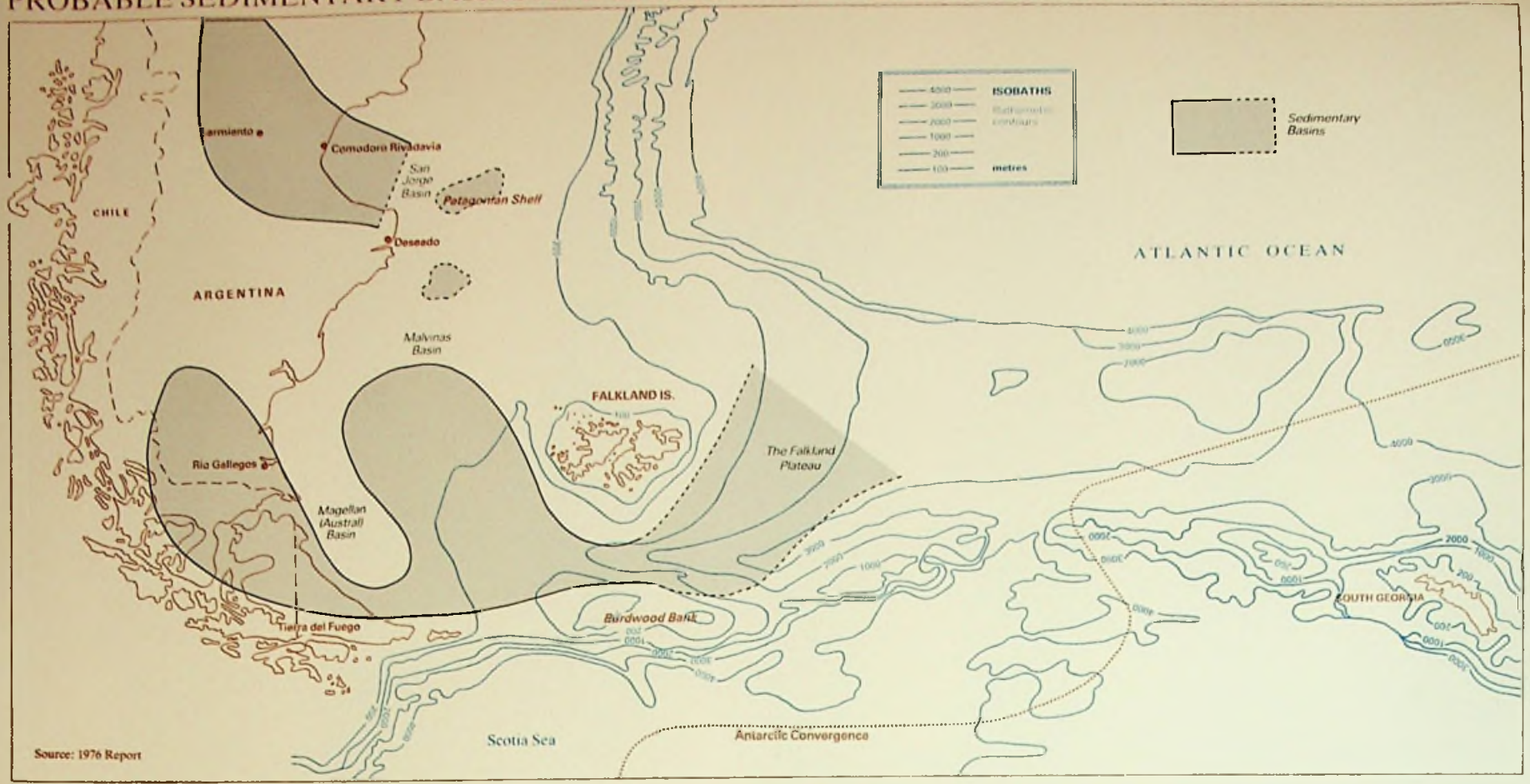
Reprinted for D.O.S. by MCE RE
5/78/780324M

PROBABLE SEDIMENTARY BASINS AND BATHYMETRY OF THE SOUTH WEST ATLANTIC

(Based on current knowledge)



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