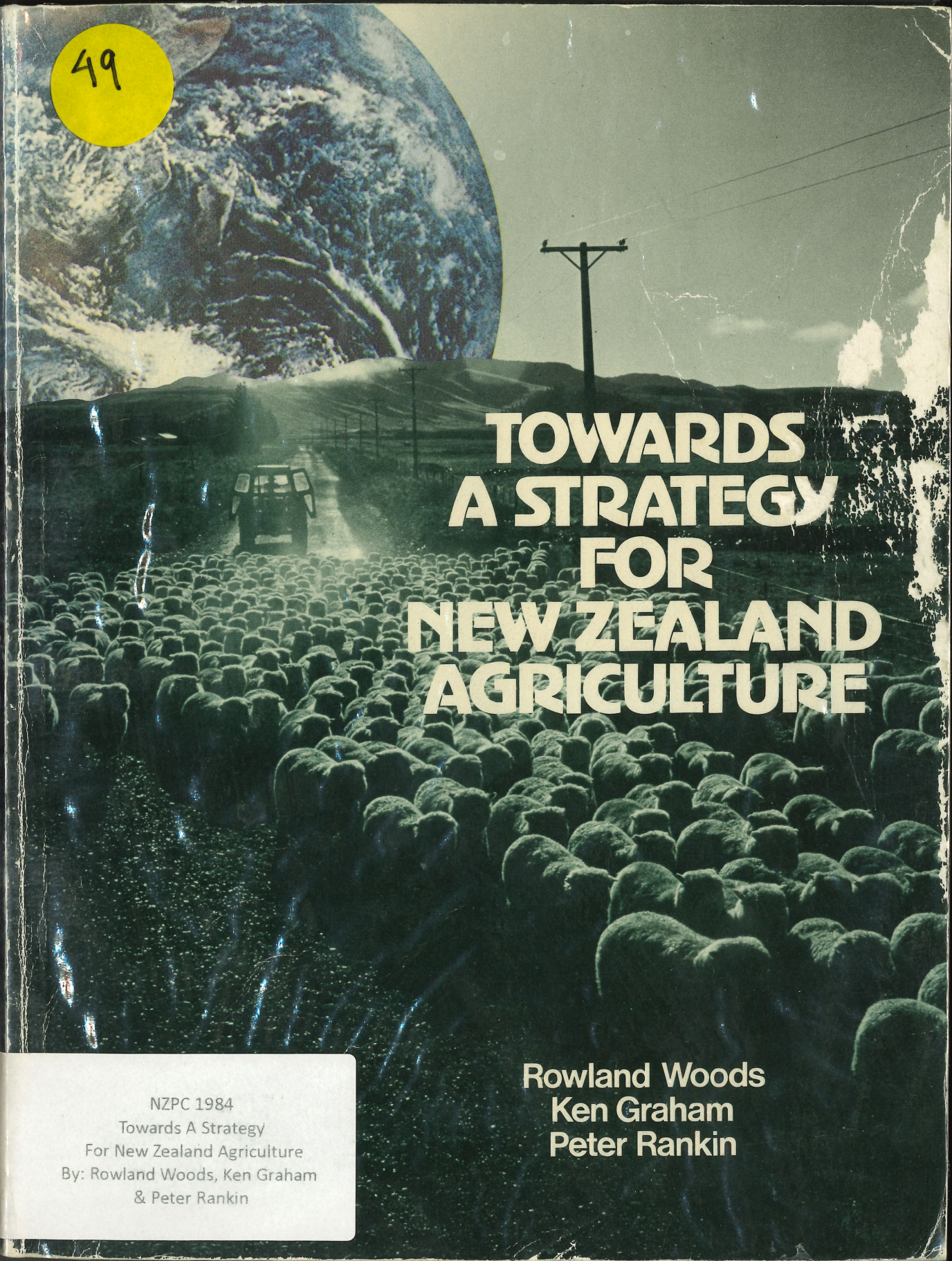
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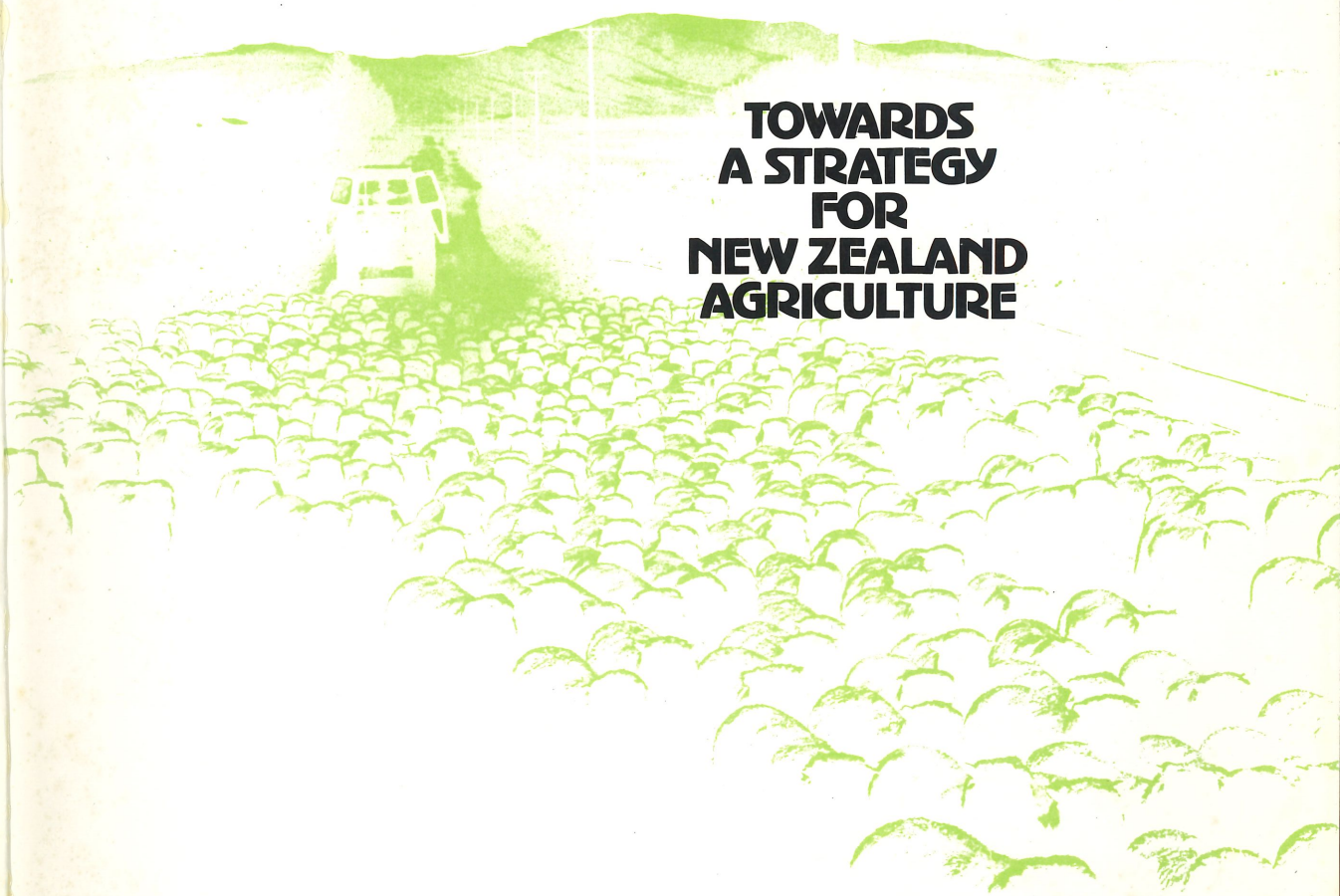
TOWARDS A STRATEGY FOR NEW ZEALAND AGRICULTURE
Rowland Woods
Ken Graham
Peter Rankin
NZPC 1984
Towards A Strategy
For New Zealand Agriculture
By: Rowland Woods, Ken Graham
& Peter Rankin



TOWARDS A STRATEGY FOR NEW ZEALAND AGRICULTURE

PREPARED FOR
THE NEW ZEALAND PLANNING COUNCIL
BY
ROWLAND WOODS, KEN GRAHAM AND PETER RANKIN

P. D. HASSELBERG, GOVERNMENT PRINTER, WELLINGTON, NEW ZEALAND—1984

"By year 2000 a world population of more than 6 billion will require an agricultural output some 50 to 60% greater than in 1980. Demand for food and agricultural products in developing countries will double. It is essential, within the next few years, to take many of the decisions which will determine the world food situation in 1990, or even in 2000."

Edouard Saouma
Director-General
Food and Agricultural Organisation
of the United Nations
1980

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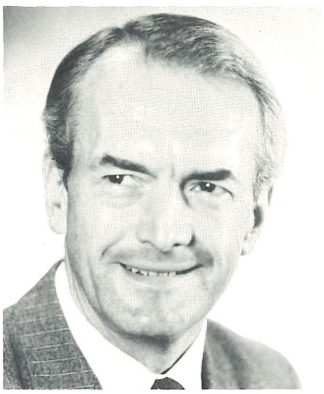
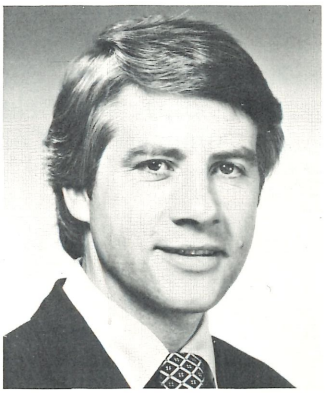
The Authors

Rowland Woods



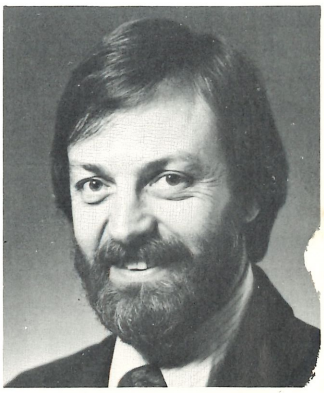
Rowland Woods is a consultant specialising in agriculture, trade and marketing. From 1979-1983 he was head of the OECD's Agricultural Trade and Markets Division in Paris, where he was responsible for planning and directing the organisation's work on international agricultural trade and agricultural commodity markets. He was European adviser, N.Z. Meat Producers' Board, Brussels (1972-1977), and chief executive, ANZDEC, a New Zealand company formed to compete internationally for consultancy contracts in the agricultural development field (1970-1972). From 1963-1969 he was agricultural adviser, New Zealand High Commission, London.

Ken Graham



Ken Graham is currently Assistant Director of Planning and Evaluation in the External Aid Division of the Ministry of Foreign Affairs. His work experience includes NZ/EEC trade policy with the Department of Trade and Industry; NZ/Asian relations, United Nations and arms control issues, and external aid with the Ministry of Foreign Affairs, with postings in Canada and Thailand. He was a graduate student intern with the U.N. Secretariat in New York and has been New Zealand Permanent Representative to the U.N. Economic and Social Commission for Asia and the Pacific. At present he is lecturing part-time on international politics at Victoria University of Wellington.

Peter Rankin



Peter Rankin worked in the Ministry of Foreign Affairs for 13 years, with postings in Delhi, Ottawa and Brussels, before taking a Master in Public Administration degree at Harvard University where he specialised in economics and agriculture. He then worked as a consultant for the Ford Foundation, the United States Department of Agriculture and other organisations, taught at Georgetown University, and directed a research programme on agricultural policy at the Washington Centre for Strategic and International Studies, before returning to New Zealand in 1980 to work as a consultant for the New Zealand Planning Council. He has held the position of director since 1982.

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Preface

This report is an attempt to assist New Zealand's national agricultural interests by developing an analytical framework as a basis for strategic decisions within the agricultural sector. The genesis of the idea was two-fold. First, a conviction within the New Zealand Planning Council emerging from its National Sectoral Programme, that more 'strategic market demand based information' on agriculture was required to assist decision-makers plan for the future. Secondly, a call from the then President of Federated Farmers, Rob Storey, for a strategy for agriculture from farm to marketplace for the next decade, one that would be flexible enough to be updated as new factors emerged in the future. It is in response to the need for quantitative data on which to base such a strategic approach that the present project was designed.

A number of organisations connected with the agricultural sector agreed to participate in the project with the Planning Council, namely Federated Farmers, the Dairy, Wool, Meat and Apple and Pear Boards, the Meat and Wool Boards' Economic Service and the Ministry of Agriculture and Fisheries.

As the project progressed, it became apparent that the resources allocated to the project were not sufficient to complete the full task envisaged, particularly within the time allotted. It was judged better to concentrate upon one aspect of the project which could be built upon in future studies. It was decided to devote the resources to a systematic study of agricultural market prospects, a subject area of first focus in strategic thinking and one which has been accorded insufficient attention in New Zealand to date. The basic premise underlying this report is that agricultural strategies for New Zealand must be market-led.

The Planning Council expresses its thanks to the Ministry of Foreign Affairs for seconding Mr Ken Graham to the Council's secretariat to work on this report for a full year. Thanks are also due to the New Zealand Meat Board for assisting the Council in obtaining the services of Mr Rowland Woods for the project.

The project benefited from the guidance and suggestions of an advisory committee under the chairmanship of Mr Neil Taylor, director of the Meat and Wool Boards' Economic Service, and we are indebted also to him and to his colleagues on the committee.

All the producer boards and the Ministry of Agriculture and Fisheries assisted significantly in bringing the project together and to all concerned we express our warmest appreciation.

I am confident that this study and the data base it has brought together will be widely recognised as an important analytical contribution to strategic planning for New Zealand's agricultural industries. The study fills a major gap in our data resources and provides an excellent basis for further development to meet future needs.

Ian G. Douglas
Chairman
New Zealand Planning Council

Introduction

For a hundred years agriculture has been the driving force of New Zealand's economy. It had become too easy to believe that some divine economic hand destined this country for agricultural production and that anything which impeded that destiny was an interference with the natural order.

It is clear now that the agricultural base of our economy did not result from a unique and unmatched capacity to convert grass into livestock products but rather from a set of economic, political and cultural links to a particular market for such products. These links were supported by technical advances such as refrigerated ocean freight. New Zealand has natural agricultural assets, primarily a favourable climate, but it does not have an unrivalled and permanent set of comparative advantages in agriculture. It also has some natural disadvantages—it is remote from markets, most of its soils are not particularly fertile, and its topography is far from benign.

Recently new problems have beset our agriculture. A malaise in general economic management has rendered some of our major agricultural industries uncompetitive in international terms. Economically illogical production and disposal policies in many developed countries have put a severe strain on our markets.

The destiny of our agriculture has encountered a crisis of confidence.

Will other sectors, such as manufacturing and tourism, replace agriculture as the main driving force of the economy? Will some of our traditional agricultural industries decline and be replaced by horticulture? Faced with questions like these, Federated Farmers in 1982 called for the development of a national strategy for agriculture. The Planning Council with its interest in directions of development in our economy and society, and its previous studies of agriculture, including Ian McLean's *The Future for New Zealand Agriculture* and C.W. Maughan's *Rural Change*, felt that any further study of the agricultural sector should start with an assessment of world market demand as a base for estimating prospects for agricultural exports.

The project on which this report is based was conceived as a response to these calls. It did not envisage a strategy as a vast and complex indicative plan producing forecasts and targets which would replace the decision-making of individual farmers and firms. Instead the project has worked towards providing a coherent framework of information to assist planners and decision-makers to assess opportunities in an increasingly complex world. It has been seen as an important step towards providing the data base on which farmers and firms can develop corporate and individual strategies which serve the national objective of maximising the foreign exchange earnings of the agricultural sector.

There are two logical and complementary starting points for an agricultural strategy—the optimal and sustainable use of the land, and the demand for agricultural products in global markets. Good strategy will emerge from an iterative process of strategy formation between those two poles.

It might be that our traditional livestock industries no longer represent the optimal use of our land resource. If we were starting from a clean slate, those industries might be given no more prominence than any other potential use. In practical

terms however, those industries have already accumulated a vast investment in resources well beyond the land itself, and the optimal use of that whole accumulated resource must be considered.

No rapid or radical transformation of that production base is likely to be socially or economically desirable but there will be many decisions at the margin which a strategic assessment of options might assist. Knowledge of production options is well developed in New Zealand but there is a strong case for improving our knowledge of markets and reviewing the way we obtain and utilise such information.

This study accordingly shifts attention to that pole and begins with an examination of world market demand prospects for the products of our land. It questions whether those prospects indicate a need to move away from some of our established production patterns and to develop new uses of the land.

In preparing the report we had a threefold aim. First, to construct an objective and analytical framework as a basis for systematic and continuing assessment of export market prospects. Secondly, within this framework to use the data available to us in 1983 to establish a tentative analysis of future market trends. Thirdly, to develop some general thoughts on the implications of the results and on the direction of strategic responses to the trends we perceived.

If the study begins to meet those needs, and provides a base for an on-going extension and improvement of strategic information, it will have served its purpose. The authors are probably more aware than anyone else of its weaknesses and of the need both to extend it to cover more products and to improve the quality of its data and analysis.

Within the limits of time and resources, the decision was made to concentrate mainly on the livestock sector and the outlook for beef, sheepmeats and dairy products. Wool and horticultural products are examined but without the benefit of a comparable information base. Significant areas such as arable crops and the emerging deer, goat and other livestock enterprises have regrettably been omitted. It is hoped that these deficiencies can be remedied by future work.

A small country like New Zealand cannot, and fortunately need not, establish its own system for gathering and processing all the data required for comprehensive analysis and monitoring of trends in agricultural production, consumption and trade. But a country as dependent on trade as New Zealand must ensure that it has access to such data and the capacity to select and interpret what is most relevant to its needs. The project therefore entailed the identification of data requirements and sources as a first step towards the construction of its analytical framework.

The United Nations Food and Agricultural Organisation (FAO) is concerned more with the problem of food deficits in poorer countries than with the export prospects of developed countries like New Zealand, and its data systems reflect this perspective. They also have some specific shortcomings[35]. Nevertheless, a first conclusion was that because of their comprehensive coverage, their internal consistency and their particular strength in demand and consumption analysis, FAO statistics and methodology provided a basic element in a data system relevant to New Zealand's needs. Accordingly, the

study provides a New Zealand oriented analysis and interpretation of FAO data. Over time, the information base should be enlarged and added to from other sources.

Constructive criticism of the report will be welcome and beneficial to the overall objective of improving national understanding of world markets for our agricultural products. It is our hope that the organisations which planned and supported the project will be joined by others in ensuring work towards that objective continues.

The report is but the tip of an iceberg of methodological reviews, literature searches, calculations, discussions and drafts accumulated over two years. Many people have helped in the process. The authors would particularly like to thank Neil Sanson, Gordon Ng and Naomi Sorenson for hours of laborious calculation; Morwen Thomas, Annelies Hoek, Carol Cooper and Honor Moss for efficient and tireless production; and the members and secretariat of the Planning Council, notably chairman Ian Douglas, for tolerant support.

We should like to acknowledge the extent to which we have drawn on previous studies of a broadly similar nature, particularly FAO's *Agriculture Towards 2000*, E.M. Ojala's *New Zealand in the Future World Food Economy*, and Resources for the Future's *Global Demand for US Food and Fiber*. A full list of sources and text references is appended. Many comments and helpful suggestions have been received on earlier drafts from the participating organisations and also from Lincoln College and Massey University's Centre for Agricultural Policy Studies. However, as authors, we take full responsibility for the text.

Rowland Woods, Ken Graham and Peter Rankin

Wellington, November 1984

Chapter 1 Recent Trends in Global Demand and Supply for Agricultural Products

1.1 Introduction

1.1.1 Within the New Zealand economy the agricultural sector occupies a dominant position. In the year to June 1983 it generated 7.8% of Gross Domestic Product (15.5% if agricultural processing is included), it provided employment for 14.4% of the New Zealand labour force, and it accounted for 69% of total export receipts. But significantly, these exports accounted for no less than 80% of the f.o.b. value of agricultural production.[1] Hence, any attempt to explore the future role of the agricultural sector in New Zealand must start with an examination of the world market and those factors likely to affect New Zealand's position as an international producer of food and other agricultural products.

1.1.2 World demand for food, and for other farm products, is determined primarily by the size and rate of growth of population, secondly by the level and rate of growth of per capita income, and thirdly by consumer behaviour and changes in consumption patterns. Trends over the period 1970–1980 in these three main determinants of demand, themselves strongly influenced by political factors, are discussed in the first part of this chapter. Subsequently the evolution of global production and trade as a response to this demand situation is analysed. The conclusions reached are carried over to Chapter 2, in which the likely future trends in world demand, production and trade are discussed. Chapters 1 and 2 provide a backdrop for the commodity-specific analyses presented in the remaining chapters of the report.

1.1.3 At the national level, as at the global level, the factors affecting total demand for food at any one time are the size of the population, the level and distribution of income, basic nutritional requirements and taste preferences. There clearly exists great variation among countries in each of these factors. Nor is the picture static, since in the longer term change occurs not only in population and income, but also in associated cultural factors such as eating habits and food preferences. While the population and income characteristics of a country are well known, its particular eating habits, translated into terms of specific commodity consumption patterns, are not. Few New Zealanders know even the quantity of milk they consume on average each year, and fewer again will have reflected on the effect on our lamb trade of the consumption in foreign markets of camel, buffalo and goat meat. A strategic view of our agricultural trade interests demands at least a rudimentary understanding of nutritional factors driving demand for food throughout the world, and how these factors are changing. We have therefore attempted to assemble information on the nutritional structure of each country's demand for food that is relevant to New Zealand's trade marketing interests.

1.1.4 The food commodities which New Zealand has hitherto shown proficiency in producing—beef and veal, sheepmeats (mutton and lamb), and milk products — are protein rich. In nutritional terms, the particular meat and milk products we wis' to market overseas are competing esser tially against protein-rich rival foods, nc only from vegetable sources but also fron eggs and fish, and from rival animal sources—buffalo, goat, pork, poultry, horse, camel, and game meats. Marketing

strategies for our major food commodities must be built on an appreciation of where demand exists and is likely to develop for protein food, and where supply might come from.

1.1.5 The factors determining a country's choice of protein food are complex and interrelated. They include the natural productive characteristics of its land and sea territory and those of its near neighbours, habitual taste preferences associated with, *inter alia*, cultural and religious beliefs, and relative production cost levels. Animal products are generally richer in protein than vegetable food sources but they also—at least in the case of modern commercial cattle and sheep production—require more sophisticated and costly production methods. The levels of protein intake and the sources of supply vary greatly between countries. For those countries which have a very low protein intake per capita—lower than daily nutritional requirements—it is a socio-economic question for their governments, a humanitarian question for the world community, whether and how such deficiencies can best be met. The key point for the purposes of this study is that there is now a general consensus that the provision of food supplies to the poorest countries must be based on the development of their own resources. The transfer of supplies from food producing and exporting countries such as New Zealand, on a continuing basis, is logistically difficult, socially disruptive and usually economically burdensome to the recipient countries concerned. Other countries have reasonable protein intake levels but satisfy their protein needs by a relative dependency on vegetable sources. In these cases, the strategic question for New Zealand is the extent to which there might be scope for a shift in demand from vegetable to animal sources, either induced by our own marketing efforts or generated internally by changes in taste preferences, possibly resulting from increasing levels of per capita incomes. Still other countries—such as the developed countries of Western Europe and North America—have very high per capita protein intake levels, and there the strategic issues for New Zealand are of a different order.

1.1.6 Despite the increased data available from various international sources based on both national statistics and household surveys, the precise nature of the relationship between income levels and nutrition, and more particularly between changes in income levels and changes in dietary patterns, is not yet well understood. We know, for example, that the *distribution* of income is an important factor, along with the average level of income, in determining the pattern of demand for food, but we do not know very much about how changes in the pattern of income distribution, as distinct from changes in the average level of income, affect overall demand. Similarly, we know that there are income thresholds which signal significant changes in diet, for example, triggering demand for animal protein, but to date attempts to specify or to quantify this threshold have not met with much success. The third element in the income/food demand relationship which requires further investigation is the 'lag' between income gains and related increases in expenditure on food. Income is an important determinant of food demand and it is important that as part of our basic market research effort, we should seek a better

and more specific understanding of how and where future changes in income will be reflected in import demand for food products.

1.1.7 *"By the year 2000 a world population of more than 6 billion will require an agricultural output some 50% to 60% greater than in 1980. Demand for food and agricultural products in developing countries will double. It is essential, within the next few years, to take many of the decisions which will determine the world food situation in 1990 or even in 2000 . . . The most acute world food and agricultural problems are centred in developing countries, particularly the poor ones, and it is they who must bear the final responsibility for improving considerably their agricultural performance. In our increasingly interdependent world however, it is essential that developed countries also recognise their responsibility. There is great need and scope for action to permit developing countries to find external markets for larger quantities of agricultural output, including processed products. . . Agricultural development and industrialisation are complementary and mutually reinforcing. . . Consequently, dynamic interaction between those two sectors has important implications for the ways in which scarce investment resources are allocated. . . A potentially and socially secure increase in supplies of the needed magnitude can come only from a global food system which integrates national high-productivity agriculture and provides for reasonably equitable distribution both nationally and internationally, of income and output. This system must be established in the remainder of the present century."* Edouard Saouma, Director General of FAO—1981[2]

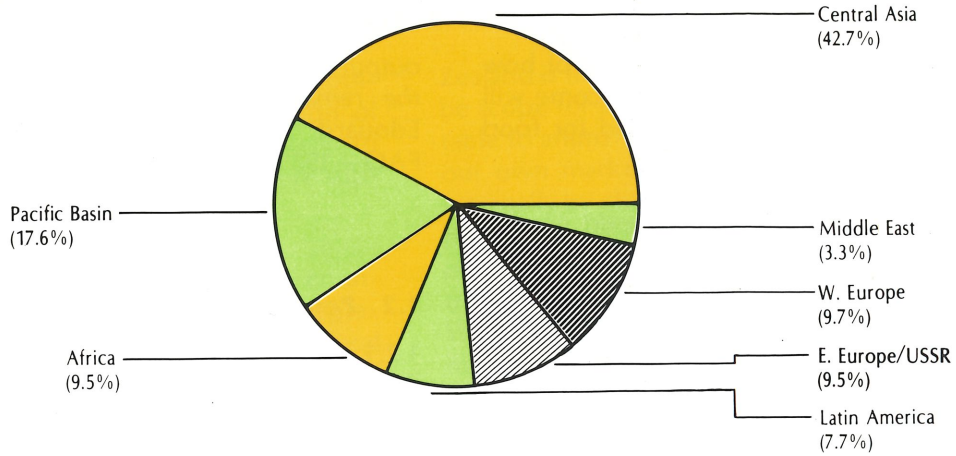
1.2 Population

1.2.1 The primary determinants of food demand are the size of the population to be fed and the rate at which this population is increasing. In the poorest countries, lack of disposable income and, frequently, inadequate storage, distribution and other infrastructures prevent the increased demand associated with increasing population from being fully reflected in apparent food consumption. This has been particularly evident in Africa where in some countries overall food supplies have not increased as rapidly as population and, as a consequence, consumption per capita has tended to fall. At the other end of the scale, the low rates of population growth experienced in the developed countries, particularly in Western Europe and North America, have contributed to increasing self-sufficiency and declining food import demand in these regions.* The fact that population growth has been slowest in those parts of the world which have traditionally been major and expanding markets for New Zealand agricultural exports has been particularly significant. Infogram 1-I illustrates the relative size, distribution and rate of growth of population over the period 1970 to 1980, and projected to

* The situation in Western Europe has been complicated by the development of the European Economic Community and in particular the Common Agricultural Policy which has led to an increase in intra-Community agricultural trade, at the expense of trade between members of the EEC and third countries.

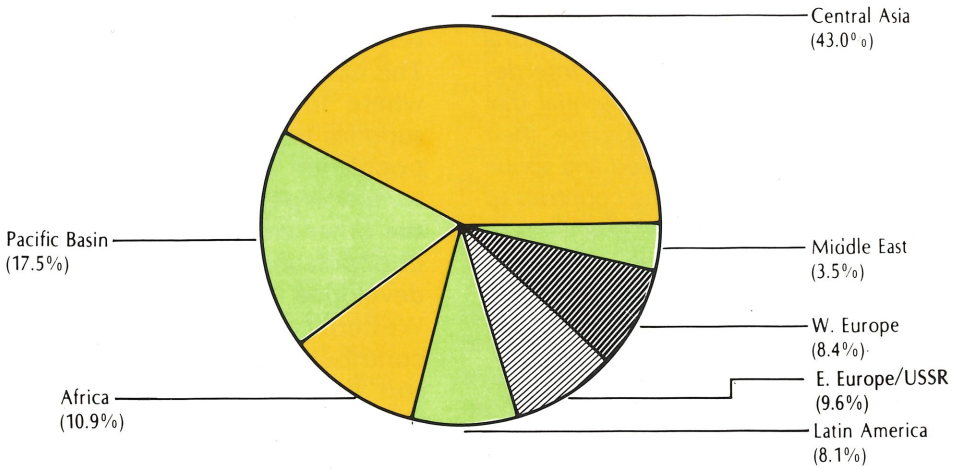
Infogram 1-I

WORLD POPULATION TRENDS



Source: Derived from World Bank data.

1970 (3659.4 Million)



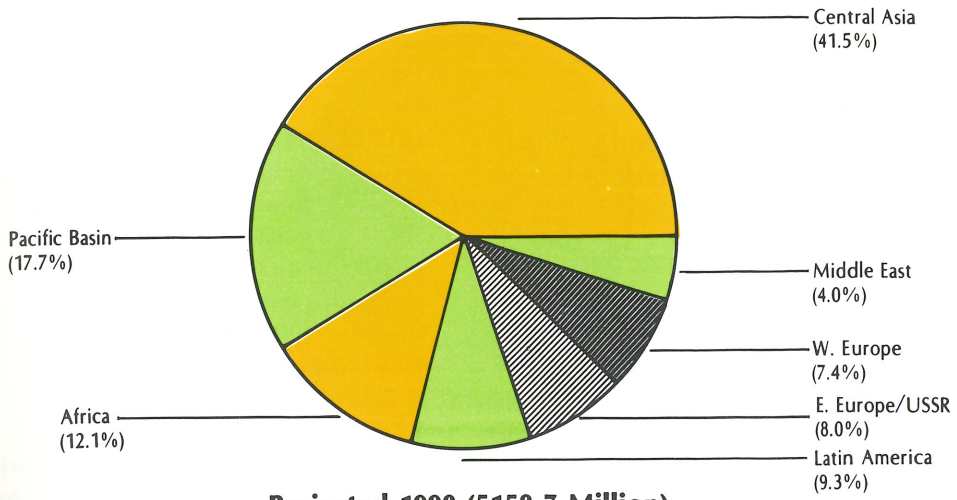
1980 (4404.1 Million)

Source: Derived from World Bank data.

2000 for each of the world's main geo-economic regions.

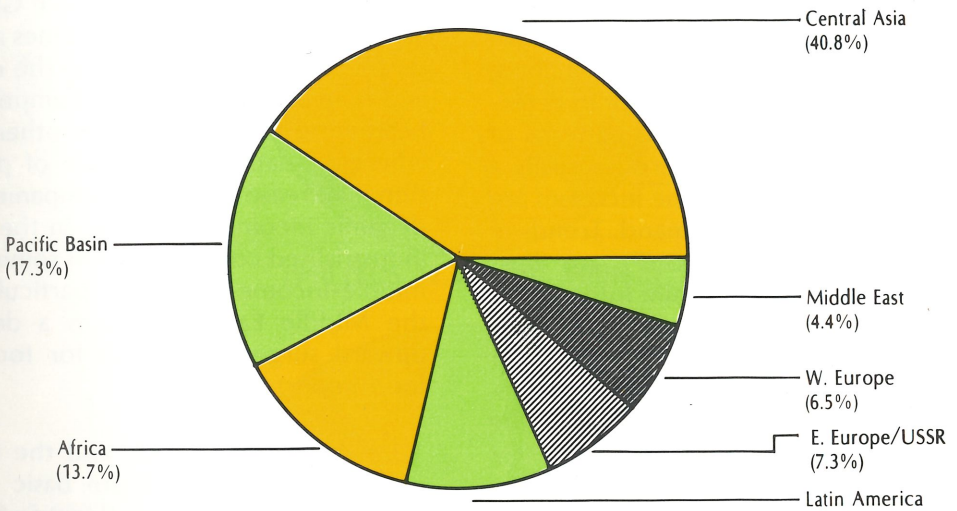
1.2.2. The tables, from which Infogram 1-I has been derived, show that there were an estimated 745 million more mouths to feed in the world in 1980 than in 1970, and that almost two-thirds of these were to be found in Africa and Asia. The population of the Pacific Basin area had increased by 127 million, or 2.8% per annum compared to 1.9% per annum for the world as a whole. Less than 6% of the global increase in population was to be found in the high-income areas of Western Europe, North America and

Infogram 1-I—World Population Trends—*continued*



Projected 1990 (5158.7 Million)

Source: Derived from F.A.O. projections (1979)



Projected 2000 (6045.0 Million)

Source: Derived from F.A.O. projections (1979).

Oceania. Hence, demographic trends alone resulted in a significant shift in the overall global pattern of demand for food during the decade and it is not surprising to find that over the period there were some significant changes in production patterns and in trade flows. For example, an increasing proportion of OECD agricultural exports is now directed towards non-OECD countries, rather than towards developed countries. Although the rapid increase in domestic production in New Zealand's traditional export markets has been the major factor inhibiting expansion of these markets, lack of population growth has also been a significant factor

and an additional element contributing to the need for 'diversification' of New Zealand exports.

1.3 Gross National Product

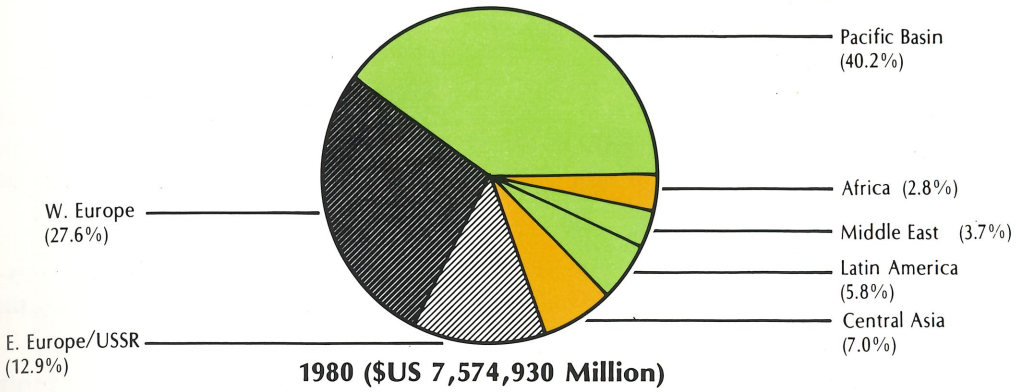
1.3.1 After population, income is the most important determinant of food demand. Moreover income per head and income distribution patterns are the most important factors in determining per capita levels of food consumption. They also influence dietary patterns and the extent to which caloric and protein components are derived from animal rather than vegetable sources. Rates of increase in income per head are an important factor in determining changes in levels and patterns of consumption, although there is usually a significant lag before income increases are fully reflected in food demand. Trends in gross national product (GNP), are illustrated in Infogram 1-II, while Infogram 1-III compares rates of increase in population with rates of increase in GNP per capita. In the developed economies, which account for only one-fifth of the world's population but almost four-fifths of its income, GNP per capita has increased more slowly than in any other politico-economic group except amongst the lowest-income countries. However, despite this sluggish rate of growth, the average annual increase in per capita income in the developed market economies was equivalent to US$236 per head in 1980. In the low-income countries, the equivalent increase was only US$5 per head. In between these extremes were the newly industrialised countries with an average increase in per capita income of US$104, the middle-income countries with US$55 per head, and the Asian Centrally Planned Economies with an estimated increase of US$11 per head. Within the Pacific Basin region, it is the Western Pacific Seaboard which has recorded the most dynamic income growth over the decade: 4.5% per annum, equivalent to US$140 per head in 1980.

1.3.2 During the decade real income growth in many parts of the world, particularly in Africa, Asia and Latin America, was not sufficient to translate population expansion into increasing commercial demand. In some areas, particularly in the poorer African countries where GNP per capita was below US$400, incomes actually declined in real terms during the decade and food availability and consumption per head were reduced. On the other hand, where a relatively rapid rate of population increase was accompanied by dynamic income growth, as in the newly industrialised countries and in some of the middle-income countries, particularly in the Middle East, there was a dramatic upward surge in demand for food and food imports.

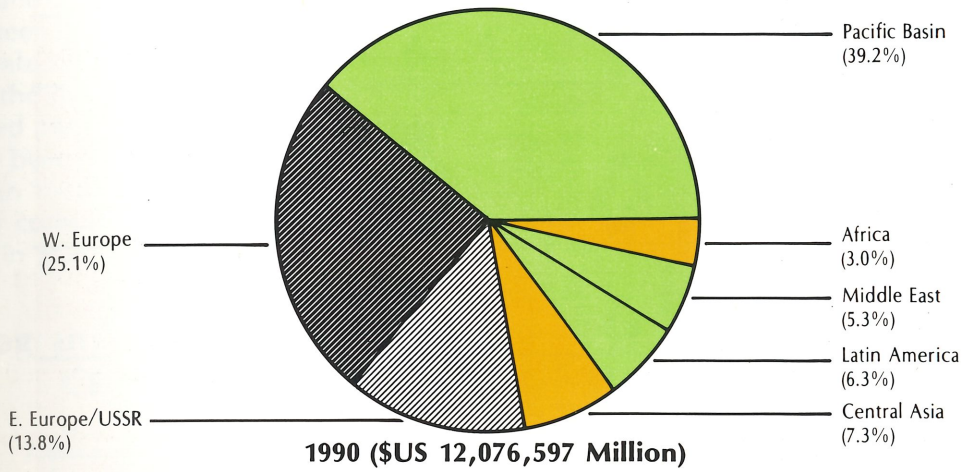
1.3.3 While population and the rate of population increase create basic conditions for potential expansion of effective demand for food, this potential will not be realised in the absence of adequate levels of income per head and preferably a dynamic rate of growth in income per head. The Western Pacific Seaboard is a sub-region in which both population growth and income growth have been substantially above average world rates. This conjunction of trends favouring a rapid increase in food demand was matched only in the Middle East and in parts of Latin America. However, these

Infogram 1–II

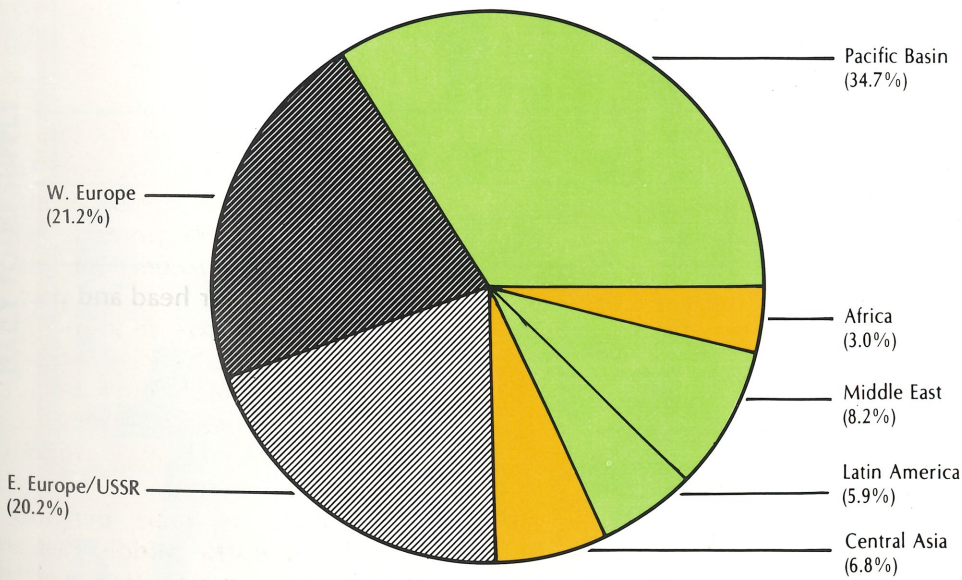
PROJECTED TRENDS IN GROSS DOMESTIC PRODUCT



1980 ($US 7,574,930 Million)



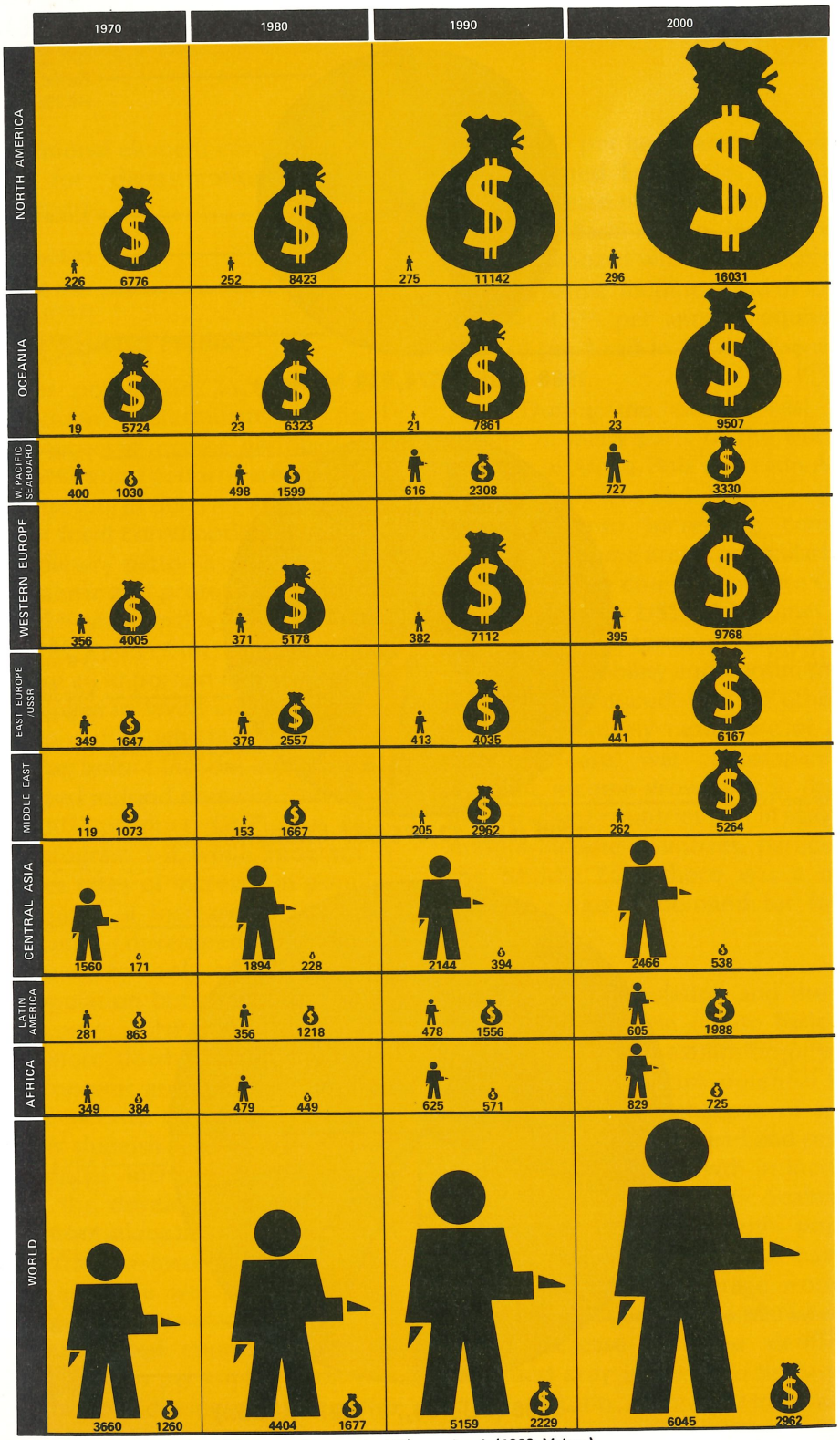
1990 ($US 12,076,597 Million)



2000 ($US 20,767,207 Million)

Source: Derived from F.A.O. Projections (1979)

Infogram 1–III **TRENDS IN PER CAPITA INCOMES**



NOTE: Population in millions Income in US$ per head (1980 Values)

Source: Derived from World Bank data (1982) and F.A.O. projections (1979).

conditions have also been characteristic features of 'middle-income' and 'newly-industrialised' countries in all regions.

1.4 Consumer Behaviour and Food Consumption Patterns

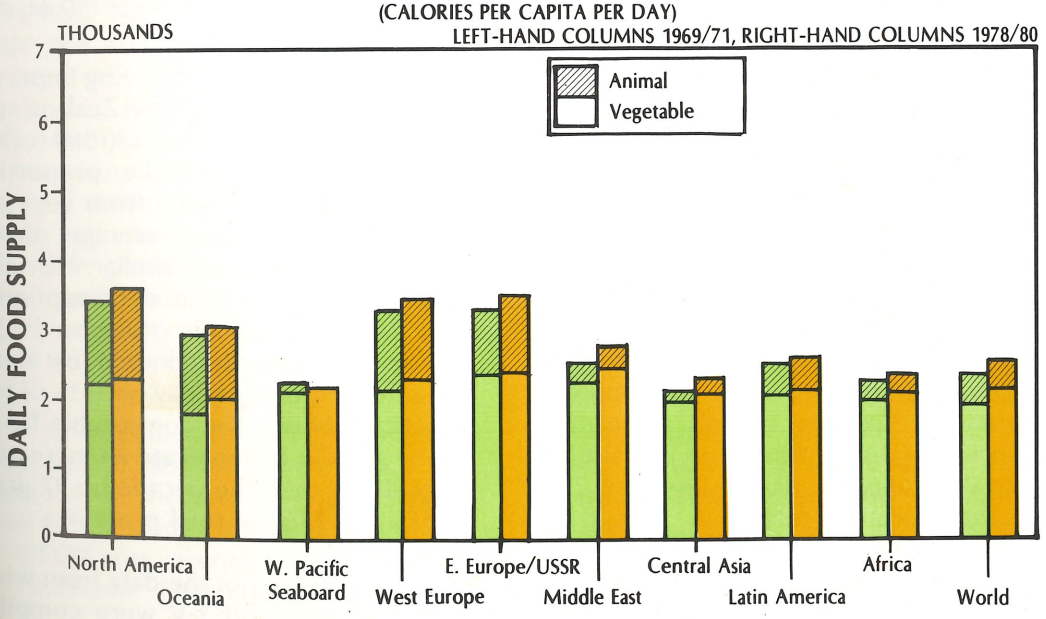
1.4.1 Another, more complex, factor affecting the overall level and pattern of demand for food is the relationship between levels of per capita income (and the rate of growth of per capita income), and the quantities of various foods consumed per head. Infograms 1-IV and 1-V have been derived from FAO data relating to food supplies and daily levels of food consumption measured in calories and in grams of protein. The data allow for waste during processing but do not take into account losses after processing, e.g. in the distribution system, in food preparation and as a result of incomplete consumption by consumers. As a consequence, the figures from which the graphs have been drawn do not pretend to represent absolute levels of total food consumption. However changes in the vegetable and animal components in food supplies, whether resulting from changing income status or changing consumer preferences, are likely to be a significant factor in determining the future patterns of global demand, particularly for livestock products.

1.4.2 There is in fact tremendous scope for improving both the quantity and the

Infogram 1–IV

CHANGES IN PATTERNS OF FOOD CONSUMPTION

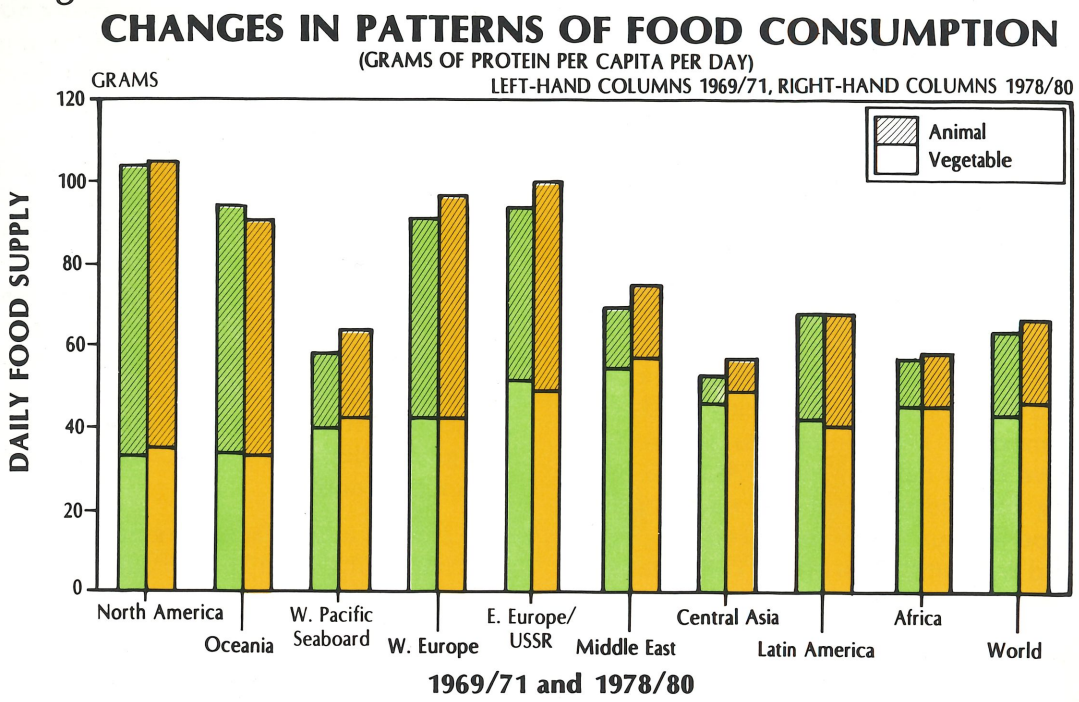
(CALORIES PER CAPITA PER DAY)



1969/71 and 1978/80

Source: FAO data (1981).

Infogram 1–V



Source: FAO data (1981).

quality of world food supplies, and in particular the proportion of calories and proteins derived from animal sources as income levels improve. In every region in the world there are countries in which more than 50% of daily protein intake is derived from animal sources and in which daily consumption of animal protein is between 45 and 95 grams per day. And yet in Africa, the Middle East and Asia, which together account for approximately 58% of the world's population, animal sources contribute on average less than 20 grams per day or less than 25% of total protein intake. It is perhaps interesting to draw a comparison between the Western Pacific Seaboard and the Middle East, since both regions have approximately similar average levels of per capita income and rates of income growth, and both are regarded as being important potential markets for New Zealand agriculture. In most respects (total caloric intake, total protein intake, proportions of caloric intake derived from vegetable and animal sources), average dietary structure is remarkably similar. However, average animal protein consumption in the Western Pacific Seaboard had increased during the decade by almost 28% (to 24 grams per day or 36% of total protein), whereas the comparable figures in the Middle East indicate an increase of only 20.9% over the decade (to 17 grams per day or 23% of total protein).

1.4.3 An analysis of the data from which Infograms 1-IV and 1-V were compiled, provides a first general indication of the effect of income on dietary patterns

within each of the major geographic regions and politico-economic groups of countries. The data show very clearly that in general as incomes rise, overall food consumption per capita tends to rise, as does the relative importance, in the diet, of foods derived from animal sources. At subsistence income levels, the diet is determined by what is physically produced and available, but at even only slightly higher income levels, the relationship between the rate of growth of income per head and variations in the levels and patterns of food consumption per head changes dramatically. Other FAO work [3] has shown that when incomes rise above a certain level, direct consumption of certain foods, e.g. cereals and starches, actually declines as livestock products, particularly meat and milk, become more readily obtainable.

1.4.4 FAO has estimated that in Africa, where the average annual consumption per head (1972–1974) was about 9 Kg of meat and 22 Kg of milk, *income elasticity of demand** for calories of animal origin was between 0.8 and 0.9. In the Middle East and Latin America, where both income and consumption levels and rates of income growth were higher than in Africa and Asia, the corresponding income elasticity of demand was estimated to be about 0.5.

1.4.5 At high income and consumption levels, overall demand is very much less responsive to income. A recent unpublished OECD study[4] indicates that within the OECD area, average food consumption between 1960 and 1980 rose by roughly 6%. However, income elasticities of demand for food fell from about 0.2 to less than 0.1. The conclusion drawn from this analysis is that per capita food consumption in most OECD countries has either reached, or is rapidly reaching, a plateau. Total per capita caloric consumption of food could actually decline in some countries in the future. Since population is also increasing relatively slowly in most OECD countries, it appears likely that aggregate consumption of food in the OECD area will grow only slowly in the future, even if the growth in per capita income were to recover from recently depressed levels. It is moreover unlikely that the historical trend of rapid and regular increases in the share of animal products in total food consumption will continue indefinitely in the OECD area, particularly in view of the increasing tendency to associate animal food sources in the diet with health problems. However, different populations will continue to respond in different ways to changes in income, and there will always be scope for rapid growth in some market segments, and for rapid product substitution, even in the most 'food-saturated' markets.

1.4.6 Infogram 1-VI shows that consumption of animal calories in the OECD area is over 1,300 calories per day, ranging from roughly 550 calories in Japan to 1,700 calories in Denmark. Between 1960/61 and 1979/80 the average percentage increase in animal product consumption was 20%, although in two countries—New Zealand and the United States—the absolute level of consumption of animal products expressed in caloric terms actually declined.

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* Percentage increase in demand per head associated with 1 percent increase in income per head.

Infogram 1-VI

Apparent Per Capita Food Consumption in Calories Per Day 1960–61 and 1979–80

Country	Animal calories Averages			As per cent of total calories Averages		Average Total Intake		% Increase 1979–80/ 1960–61
	1960–61	1979–80	1979–80/ 1960–61	1960–61	1979–80	1960–61	1979–80	
Australia . .	N.A.	1 164	–	–	37.1	N.A.	3 139	–
Austria . .	1 130	1 492	132.0	36.4	44.8	3 102	3 333	107.4
Belgium/Lux . .	1 135	1 456	128.3	36.1	44.4	3 142	3 282	104.5
Canada . .	1 366	1 458	106.7	45.6	47.3	2 994	3 084	103.0
Denmark . .	1 522	1 718	112.9	45.5	49.7	3 343	3 455	103.4
Finland . .	1 197	1 464	122.3	38.5	48.0	3 109	3 052	98.2
France . .	1 128	1 546	137.1	36.1	45.0	3 124	3 437	110.0
Germany . .	1 255	1 568	124.9	39.8	45.8	3 150	3 423	108.7
Ireland . .	1 441	1 492	103.5	41.4	42.3	3 482	3 520	101.1
Italy	530	946	178.5	19.4	27.5	2 726	3 435	126.0
Japan . .	222	559	251.8	9.6	21.6	2 302	2 582	112.2
Netherlands . .	1 076	1 432	133.1	32.9	41.1	3 270	3 480	106.4
New Zealand . .	1 643	1 558*	94.8	50.2	50.1*	3 274	3 107*	94.9
Norway . .	972	1 210	124.5	32.7	37.8	2 974	3 201	107.6
Portugal . .	498	759*	152.4	18.9	24.3*	2 640	3 126*	118.4
Spain . .	410	917	223.7	15.7	29.8	2 617	3 073	117.4
Sweden . .	1 263	1 380	109.3	42.2	46.0	2 996	2 997	100.0
Switzerland . .	1 159	1 448	124.9	34.8	43.1	3 327	3 360	101.0
United Kingdom . .	1 150	1 306	113.6	35.8	40.5	3 214	3 228	100.4
United States	1 331	1 262†	94.8†	42.1	37.5†	3 162	3 367†	106.5
Mean‡ . .	1 075	1 307	120.8	34.4	40.2	3 050	3 239	106.2
SD‡	378	292	–	10.7	8.2	286	223	–
V‡	.352	.224	–	.310	.203	.094	.069	–

SD = Standard Deviation, V = Standard Deviation/Mean. * 1976–77 † 1978–79 ‡ Excluding Australia
N.A. = Not available

Source: OECD, 1982 (Computed from OECD, Food Consumption Statistics).

The increased consumption of animal products in absolute terms in most countries has also been associated with a rise in the proportion of total food calories obtained from these products. Therefore, animal products have tended to substitute for vegetable products in the diet. Only in the United States, where the level of consumption of animal products, particularly meat, has been at a high level over a considerable period, was the share of total calories derived from this source

significantly lower at the end of the period than at the beginning. For the group of countries as a whole, the proportion of calories derived from animal products rose from roughly 34% in 1960–61 to 40% in 1979–80.

1.4.7 The OECD study reaches the tentative conclusion that per capita food consumption expressed in calories appears to be reaching a ceiling in the majority of OECD countries. For most countries this ceiling appears to lie between 3,300 and 3,600 calories per day. Japanese food consumption appears to be stabilising at a substantially lower level of around 2,600 calories. For eight of the 21 countries analysed, it appears that further growth in per capita income is unlikely to give rise to an increase in per capita food consumption. In the remaining 13 countries, further growth is possible although this is likely to be small. In seven of these (Austria, Belgium/Luxembourg, France, Italy, Japan and the Netherlands), the increase would be accompanied by the substitution of animal products for vegetable products. In the United States, the reverse relationship would occur, i.e. the continued substitution of vegetable for animal calories. In the remaining five countries (Germany, Norway, Portugal, Spain, Sweden), both animal and vegetable product consumption would increase as the result of the growth in income.

1.4.8 An analysis of the share of food consumption derived from eight major food groups* since the mid-1950s demonstrates the extent to which dietary structures in the OECD countries are becoming similar. For example, in the mid-1950s, the high meat consuming group contained no European countries. Some of these, most notably France and Germany, have undergone a profound change in dietary structure. For others, for example Denmark and the Netherlands, the change has been significant but somewhat less dramatic. Although differences still exist between the dietary patterns of OECD countries, most notably between such countries as Japan and the United States, the general picture is one of increasing similarity in dietary structure.

1.4.9 The majority OECD diet, which is shared by 17 of the 22 countries analysed, is characterised by a low share of cereals in the diet and high shares of meat and eggs, oils and fats, and milk and milk products. However, differences do exist between these countries, for example in the relative importance of meat versus milk and dairy products in the diet. The remaining OECD countries fall into three additional groups—two Mediterranean, one containing Italy and Spain and the other containing Portugal, and finally a grouping involving Japan and Yugoslavia. These groups differ primarily in terms of the proportion of total calories obtained from cereals.

1.4.10 Although the scope for dietary change is much less in comparison with the last two decades, some substitution between foods is likely to continue. For many OECD countries, this substitution appears likely to be more significant *within* rather than *between* the major food groups. The major substitutions of the

* Cereals and starchy foods, meat and eggs, oils and fats (including butter), sugar, milk and milk products (excluding butter), fruits and vegetables, pulses and nuts, and fish.

past, for example between products derived from animals and products of vegetable origin, are likely to be less pronounced in the future in the majority of these countries. In fact, looking further ahead, it seems likely the proportion of animal products in total food consumption is likely to 'peak' in the high-income countries as a group and then decline, following the pattern which seems to be emerging in the United States.

1.5 Summary of Trends in Demand

1.5.1 Certain conclusions can be drawn from the analysis of trends in population, income per head, and patterns of food consumption, and the relationships which have developed between these trends over the period 1970–1980.

1.5.2 In the high-income countries, particularly in the absence of significant population growth, expansion of overall demand for food is tending to peter out. The dynamic market growth which has occurred for some products has been at the expense of a decline in consumption of others, until now probably within the same general product category (i.e. animal or vegetable). Thus increases in per capita consumption of poultrymeat have been associated in North America with a reduction in per capita consumption of beef and veal and in Western Europe and in Oceania with a reduction in the consumption of sheepmeat. These trends are not necessarily reflected in comparable shifts in shares of private consumption expenditure because of the increasing 'value added' components in food production and in expenditure on food.[17]

1.5.3 Amongst the low-income countries, with per capita incomes of less than US$600 (1980), significant rates of population growth have not been matched by comparable increases in real gross national product or in food supplies. In fact in many cases real GNP per capita has actually declined, and the levels of food availability and per capita food consumption have also been reduced. It is significant that in those very low-income countries which have been able to achieve an increase in food consumption, the increased consumption has been of vegetable rather than animal products. This is notwithstanding that animal products occupy a traditional, albeit minor, position in the diet in some of the poorest countries, particularly in Africa. It would be helpful to be able to determine under what conditions, and in particular at what overall levels of income per head and food consumption per head, animal products are introduced to the diet on a regular or continuous basis. Although it is understood that various attempts have been made (e.g. by the World Bank and FAO) to analyse the relationship between income growth and shifts in dietary patterns, it has not been possible to locate any definitive conclusions or studies in this area. It is a field in which further research could make a significant contribution to longer-term strategic market planning.

1.5.4 The most dynamic growth in food demand as reflected in increased consumption, has been in the newly industrialised countries and other middle-income countries, particularly where income growth has occurred in the context of large or rapidly expanding populations. However, the relationship between rates of income increase and changes in consumption patterns is another area in which there is a dearth of

conclusive research information. It is recognised that there can be a considerable time-lag before changes in income status are reflected definitively in food consumption patterns. Income distribution patterns are also significant, although again, their relationship to changing patterns of food consumption is generally not well documented.

1.5.5 Unfortunately, data relating to GNP, GNP per capita and food supplies are not available for most of the Centrally Planned Economies. Because of the insulated character of these economies, population and income growth do not have the immediate and very visible effects on food markets and food supplies that occur in the market economies. Nevertheless, social and political pressures have led to measures in all these countries to increase available food supplies, both through expanded agricultural production and through increased imports.

1.5.6 The relationships between population, income and patterns of consumption are critical elements in any analysis of likely longer-term trends in world demand for agricultural products. These relationships have become more complex, particularly in high-income areas where food consumption appears to be reaching physiological limits. They are of great significance to New Zealand and other food producing countries because a small proportionate increase or decrease in demand (or supply) in developed countries may have much greater practical market implications than a large proportionate change in a developing country with low per capita consumption. On the other hand, a fast rate of income growth in a middle-income country can result in a comparatively large absolute increase in demand, especially when multiplied by a rapid population increase.

1.5.7 These very general conclusions can be related to the geographical regions, and to the major politico-economic groupings of countries as follows:

(i) Overall food consumption in the wealthy countries of Western Europe and North America has become relatively static. As a consequence, market shares for specific products in these countries has increased only at the expense of other products. Under these conditions, price competition, and competition in areas such as product development, promotion and merchandising, has become more intensive and more aggressive.

(ii) In the middle-income countries and newly industrialised countries, particularly in Latin America, the Western Pacific Seaboard, the Middle East, and in parts of Africa, rising populations and increasing incomes have generated a rapid increase in demand for food in general, and for livestock products in particular. In many of these countries, dietary patterns have not yet been stabilised and the respective positions of, for example, different types of meat and dairy products, depend very largely on the price and availability of competing sources of animal calories and proteins. These markets have also become important

growth markets for other luxury or semi-luxury food products including a range of horticultural products.

(iii) In the low-income (least developed) countries, particularly in those parts of Africa where the transition from subsistence to market economy has still to be achieved, the current rate of growth of effective demand for food products is weak. Where some growth has occurred, the demand has been for bulk low-cost food cereals except where aid schemes have created (or facilitated) a limited demand for dairy products. In other low-income areas, such as in Asia, where the rate of growth of income per capita has been almost three times as high as in the low-income African countries, agricultural production has expanded relatively quickly and there has been a significant improvement in the availability of food supplies, mainly from domestic sources.

(iv) Income and population trends in the centrally planned economies have created strong, albeit latent, increases in food demand, particularly in demand for livestock products. While the indications are that domestic agricultural production has not increased as rapidly as food demand in these countries, the consequent import requirement has proved to be unpredictable, both as to timing and as to content. The question, more political than economic, is whether in future these countries are going to give priority to the importation of livestock products or to the importation of feeding stuffs on which to base domestic livestock production industries.

1.6 Agricultural Production

1.6.1 Over the decade 1970–1980, world agricultural and food production increased (by 2.5% per annum) more rapidly than population (1.8% per annum) except in some of the poorest countries in Latin America and Africa. Overall, the world food situation improved substantially over this period, notwithstanding production instability in some major importing countries, notably the USSR, and the continuing vulnerability of the poorest countries to the vagaries of the climate and the effects of poor infrastructures and distribution systems, and producer incentives, especially in Africa.

1.6.2 Although there was an upward surge in 1981, world cereal production had previously remained relatively stable at about 1500 million tonnes during the late seventies. However, cereal consumption continued to increase in line with population and income growth, and by the end of 1980–81 stocks had been run down to an estimated 15% of world cereal consumption. They subsequently rose to over 20% in 1981–82, significantly above the level of 18% which has been estimated by FAO to be about the safe level for world food security.

1.6.3 The most dramatic increase in the consumption of cereals has been in the countries where increased animal feeding has been an important factor in rapidly increasing import demand. Net imports of grains by the developing countries as a group totalled over 50 million tonnes in

1980–81, at a cost of about US$10,000 million. This contrasts with their net grain imports of 20 million tonnes in 1970–71 at a cost of US$2,000 million (US$5,000 million in 1980 dollars). However, almost all the increase was accounted for by middle-income countries which have been increasing their feedgrain imports by around 10% per year. The low-income countries on the Western Pacific Seaboard improved their grain production and reduced their imports substantially during the 1970s. However, the food situation throughout much of sub-Saharan Africa actually deteriorated over this period.

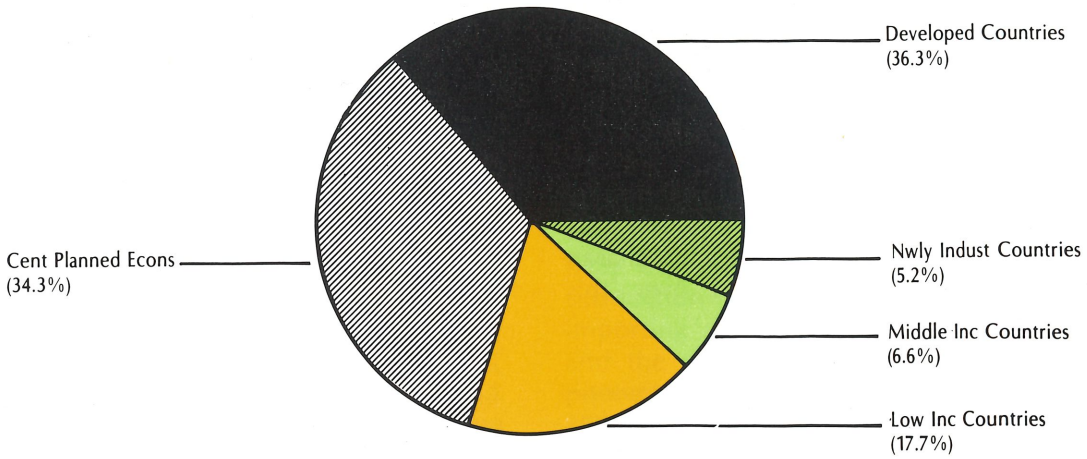
1.6.4 Although direct cereal consumption has increased as population has increased, it has already been shown that except at the lowest and highest levels of per capita income, people prefer, as incomes rise, to consume less grain and to substitute livestock products in their diets. As a consequence, the trend in world cereal consumption has been towards greater use for livestock feed relative to use for direct human consumption, except during periods of severe disturbance in world cereals markets, such as in 1972. This increasing use of cereals for livestock feed has had important implications, not only for grain exporters and importers, but also for the producers and consumers of livestock products. In theory at least, a larger 'feed' element in the cereals markets should result in increased elasticity of demand and greater market stability. However, in most of the more affluent countries, domestic cereals' prices are insulated from fluctuations in world market prices. As a consequence, demand in these countries does not react to world price fluctuations and the burden of adjustment is falling increasingly on exporters and on the poorest importing countries where nutritional levels are dependent on imported supplies of food grains. Although global consumption of cereals is increasing and the proportion consumed in traditional areas such as North America and Western Europe is declining, supply has become more concentrated, with North America becoming increasingly dominant. The extent to which these various developments could lead to increasing 'residual market' opportunities for cheap livestock products which are in structural surplus, is a question deserving further consideration.

1.6.5 From 1970–1980, total world output of meat increased by 34% (i.e. an average annual rate of almost 3%). Red meat production (beef, veal and sheepmeat) increased by 18% but whereas it accounted for almost 43% of all meat produced in 1970, its share has dropped to 37% by 1980. The contribution of sheepmeat declined from 5.4% in 1970 to less than 4.2% in 1980. Beef and veal fell from 37.3% to 32.8% over the same period. Meanwhile, world pigmeat production increased by 41% (from 38.7 million tonnes to 54.6 million tonnes) and poultrymeat increased by 77% (from 15.4 million tonnes to 27.3 million tonnes). Pigmeat and poultrymeat shares of world meat output rose from 37.1% to 39.0% and from 14.7% to 19.5% respectively. This reflects the trend noted earlier towards the increasing use of cereals as feed. Pigs and poultry are more efficient than cattle and sheep as converters of grain feeds, and grain-fed systems have shown greater technological adaptability than pasture-fed systems in recent decades.

Infogram 1–VII

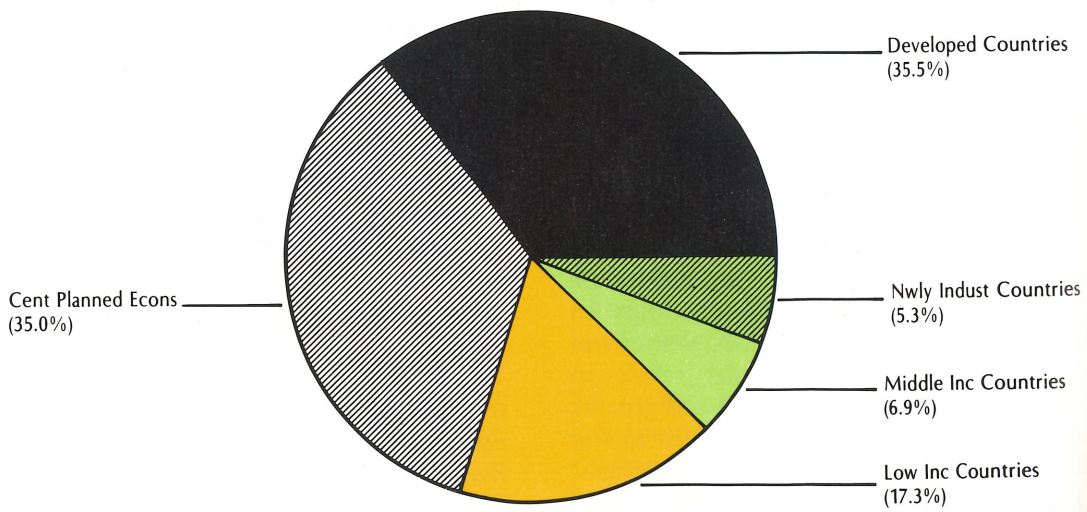
WORLD PRODUCTION AND TRADE IN CEREALS

(A) PRODUCTION



QUANTITY SHARES OF AV. ANNUAL PRODUCTION 1969/71

(1231.6 Million Tonnes)



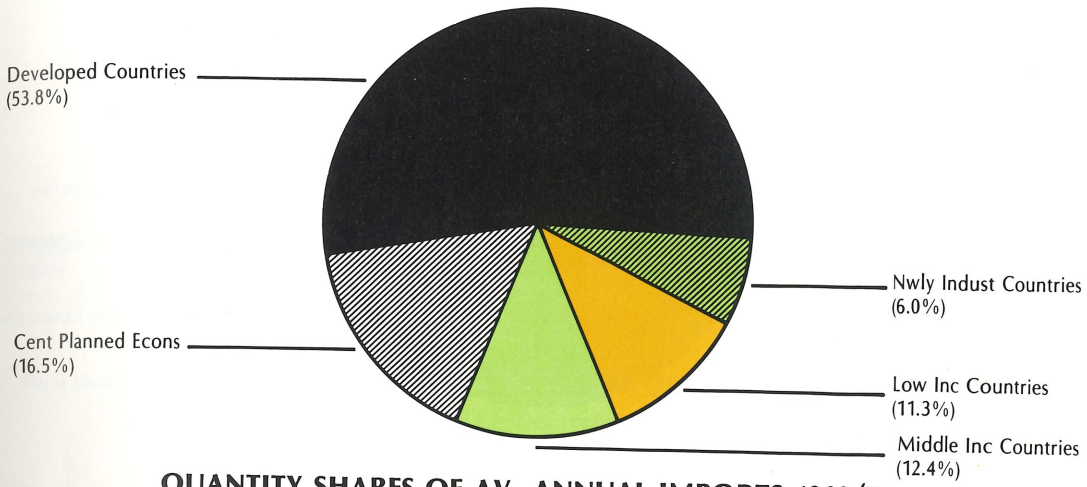
QUANTITY SHARES OF AV. ANNUAL PRODUCTION 1979/81

(1587.0 Million Tonnes)

Source: Derived from F.A.O. data (1981).

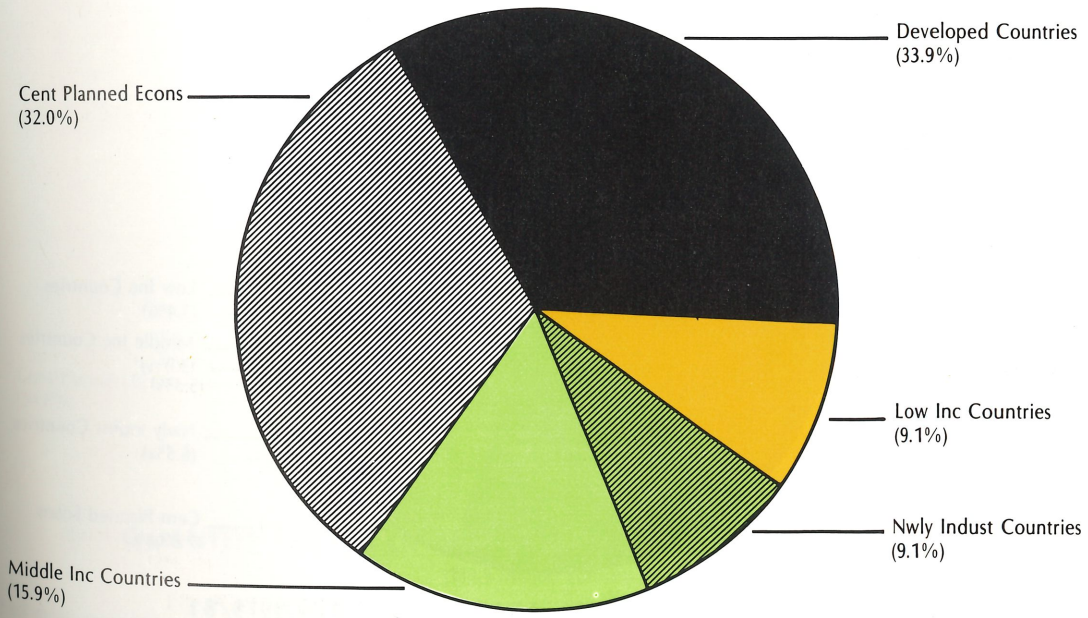
Infogram 1–VII—World Production and Trade in Cereals—*continued*

(B) IMPORTS



QUANTITY SHARES OF AV. ANNUAL IMPORTS 1969/71

(107.7 Million Tonnes)



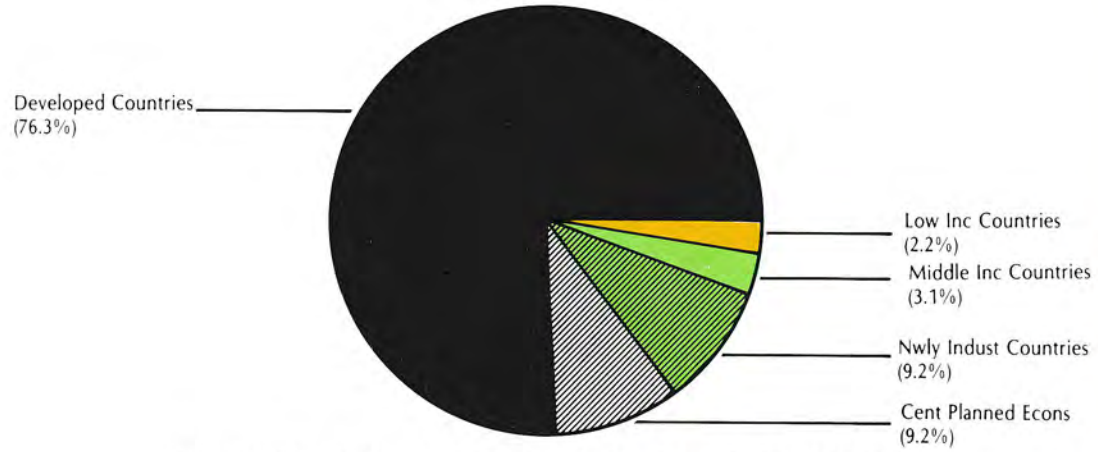
QUANTITY SHARES OF AV. ANNUAL IMPORTS 1979/81

(217.8 Million Tonnes)

Source: Derived from F.A.O. data (1981)

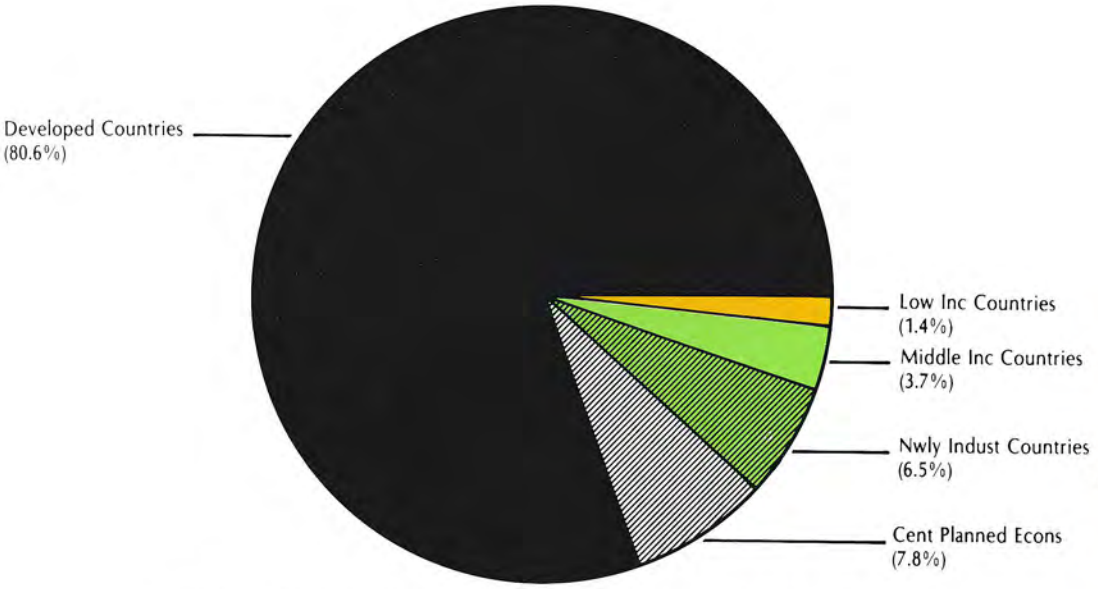
Infogram 1–VII—World Production and Trade in Cereals—*continued*

(C) EXPORTS



QUANTITY SHARES OF AV. ANNUAL EXPORTS 1969/71

(125.3 Million Tonnes)



QUANTITY SHARES OF AV. ANNUAL EXPORTS 1979/81

(230.5 Million Tonnes)

Source: Derived from F.A.O. data (1981)

Infogram 1–VIII

WORLD

Cent Planned Econs
(32.6%)

QUANTITY

Cent Planned Econs
(34.8%)

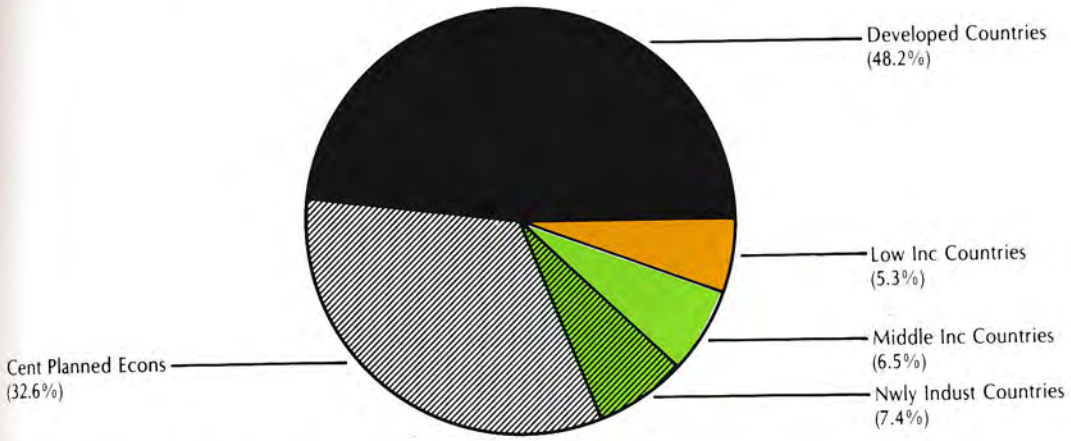
QUANTITY

*All meats including beef, sheep

Infogram 1–VIII

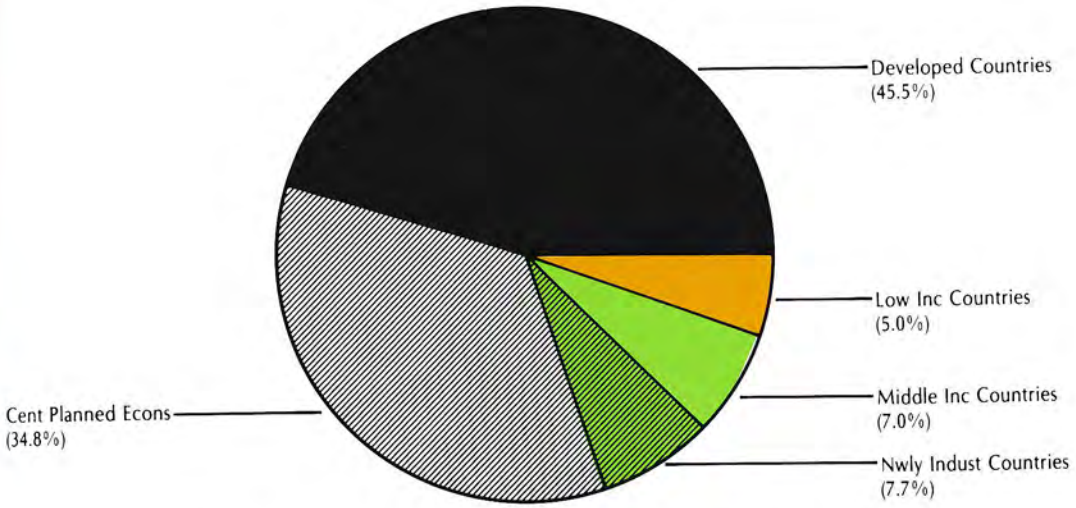
WORLD PRODUCTION AND TRADE IN MEAT

(A) ALL MEATS*—PRODUCTION



QUANTITY SHARES OF AV. ANNUAL PRODUCTION 1969/71

(104.2 Million Tonnes)



QUANTITY SHARES OF AV. ANNUAL PRODUCTION 1979/81

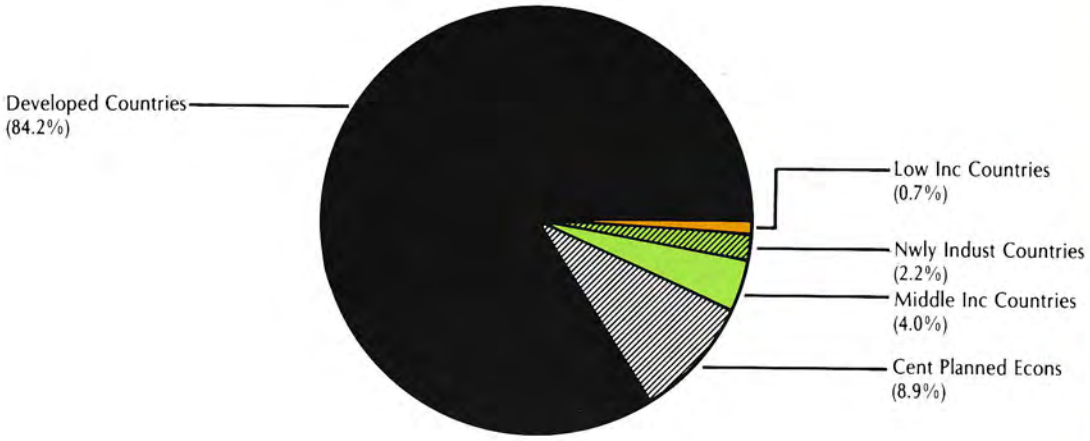
(139.9 Million Tonnes)

*All meats including beef, sheepmeat, pork, poultrymeat etc.

Source: Derived from F.A.O. data (1981).

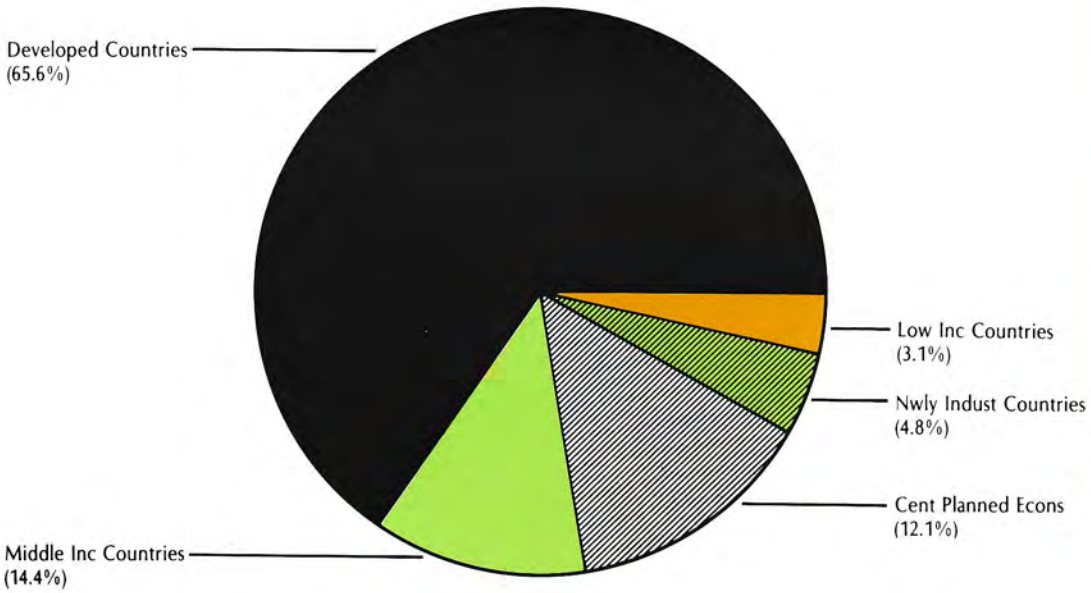
Infogram 1-VIII—World Production and Trade in Meat—*continued*

(A) ALL MEATS—IMPORTS



QUANTITY SHARES OF AV. ANNUAL IMPORTS 1969/71

(4.5 Million Tonnes)



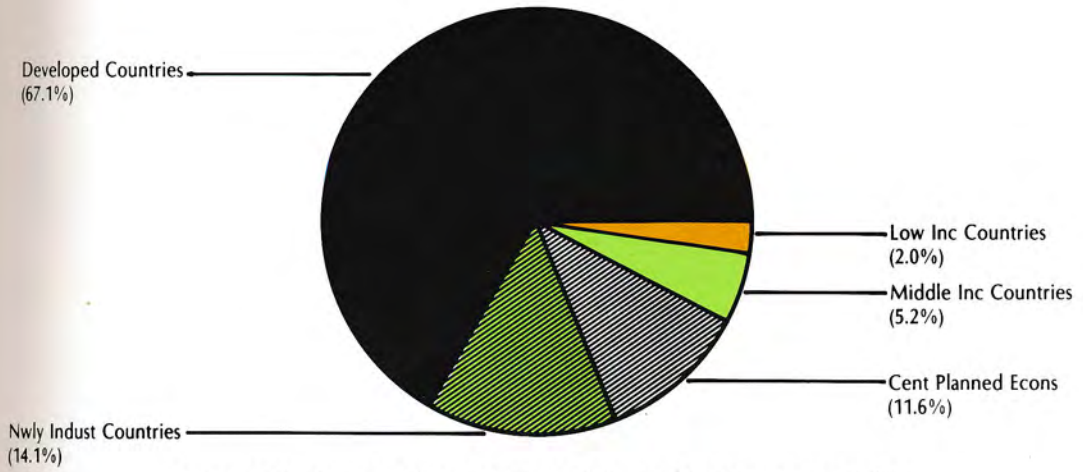
QUANTITY SHARES OF AV. ANNUAL IMPORTS 1979/81

(7.9 Million Tonnes)

Source: Derived from F.A.O. data (1981).

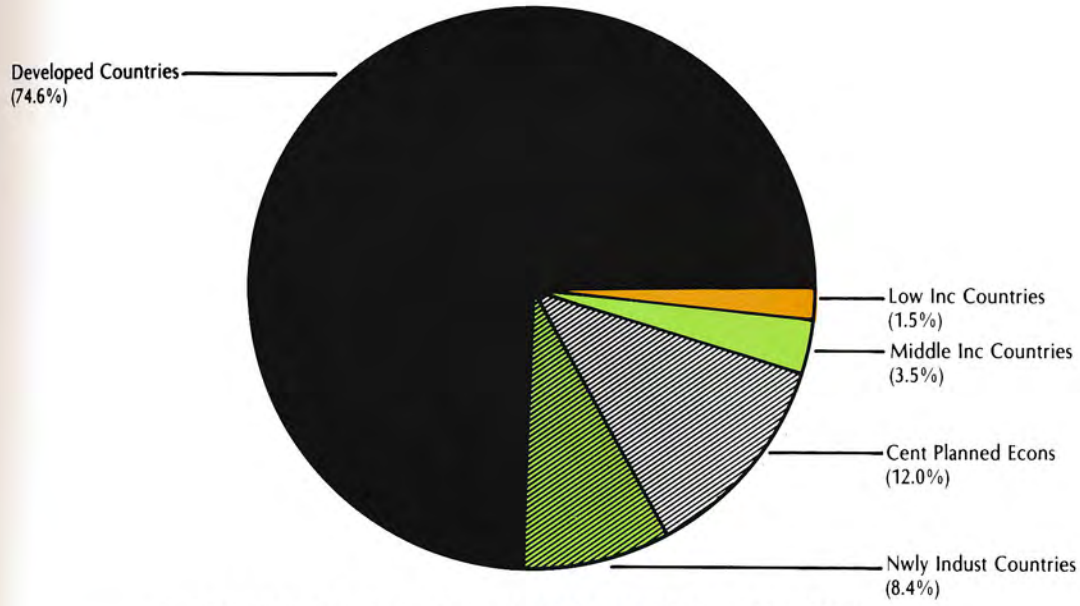
Infogram 1-VIII—World Production and Trade in Meat—*continued*

(A) ALL MEATS—EXPORTS



QUANTITY SHARES OF AV. ANNUAL EXPORTS 1969/71

(4.6 Million Tonnes)



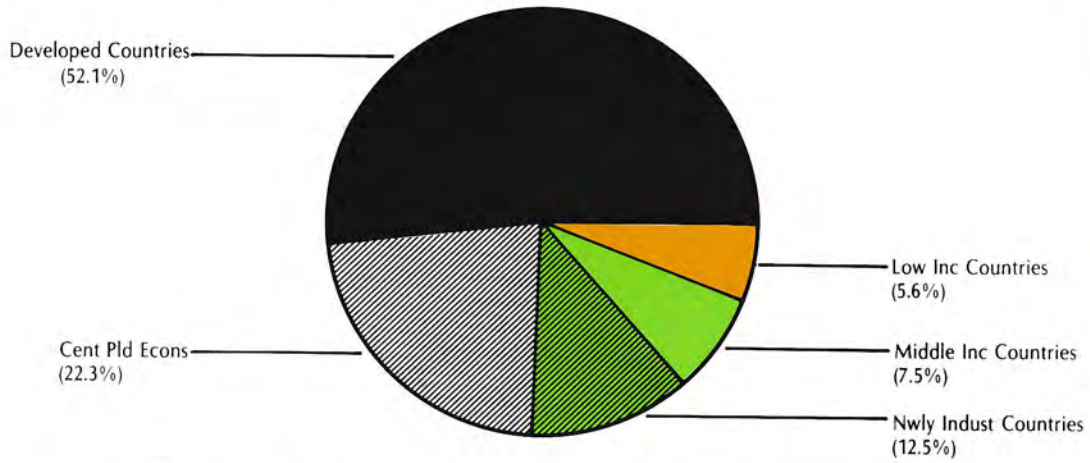
QUANTITY SHARES OF AV. ANNUAL EXPORTS 1979/81

(8.1 Million Tonnes)

Source: Derived from FAO data (1981).

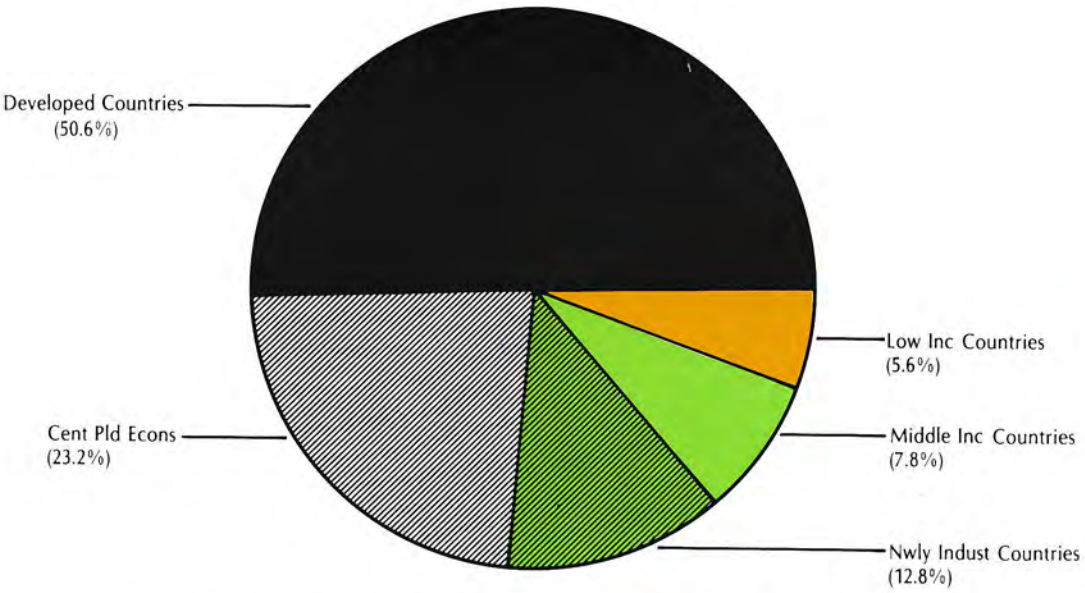
Infogram 1-VIII—World Production and Trade in Meat—*continued*

(B) BEEF AND VEAL—PRODUCTION



QUANTITY SHARES OF AV. ANNUAL PRODUCTION 1969/71

(38.8 Million Tonnes)



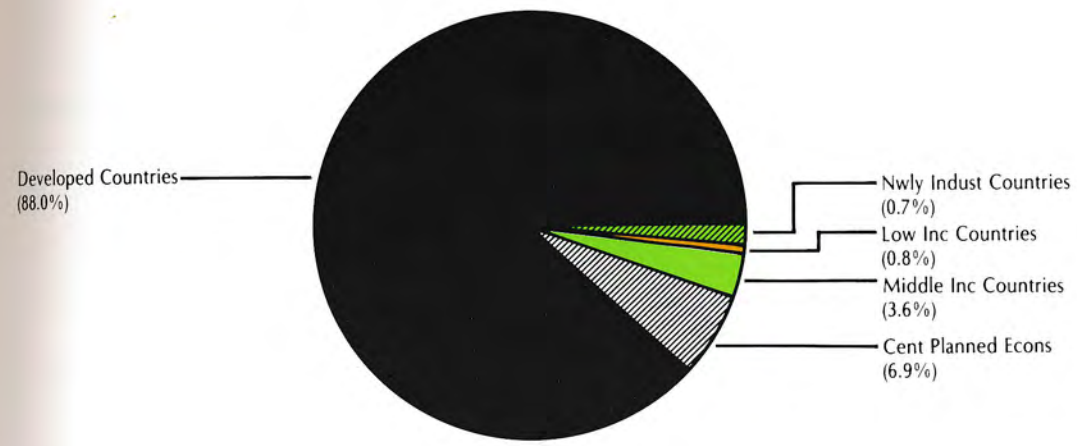
QUANTITY SHARES OF AV. ANNUAL PRODUCTION 1979/81

(45.8 Million Tonnes)

Source: Derived from F.A.O. data (1981).

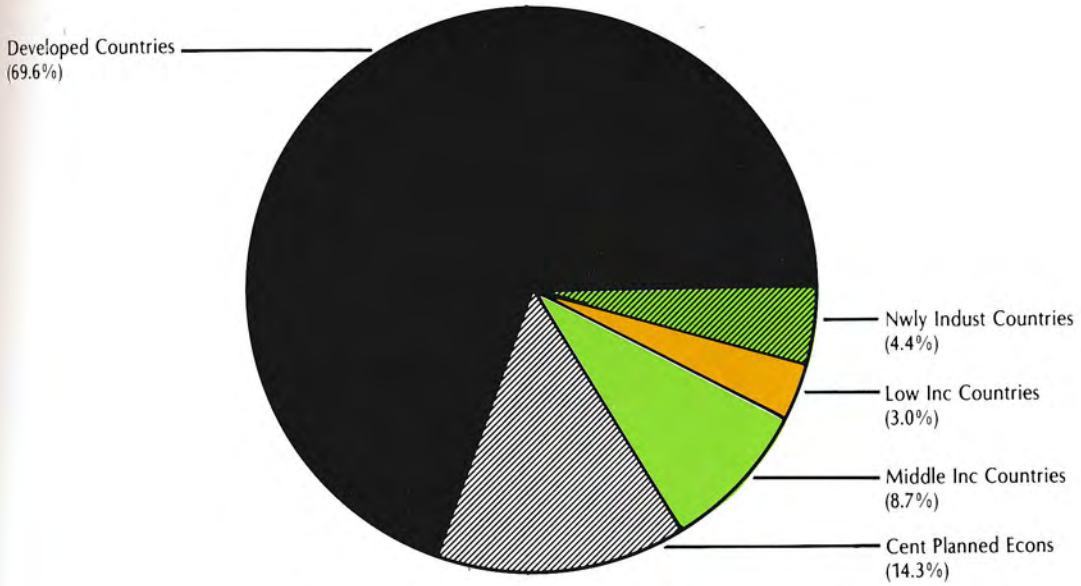
Infogram 1-VIII—World Production and Trade in Meat—*continued*

(B) BEEF AND VEAL—IMPORTS



QUANTITY SHARES OF AV. ANNUAL IMPORTS 1969/71

(1.8 Million Tonnes)



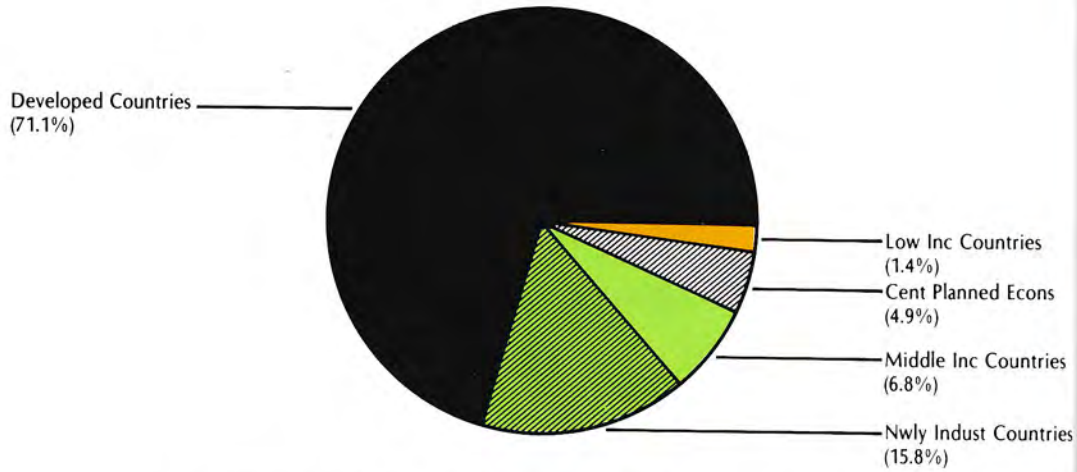
QUANTITY SHARES OF AV. ANNUAL IMPORTS 1979/81

(3.2 Million Tonnes)

Source: Derived from F.A.O. data (1981).

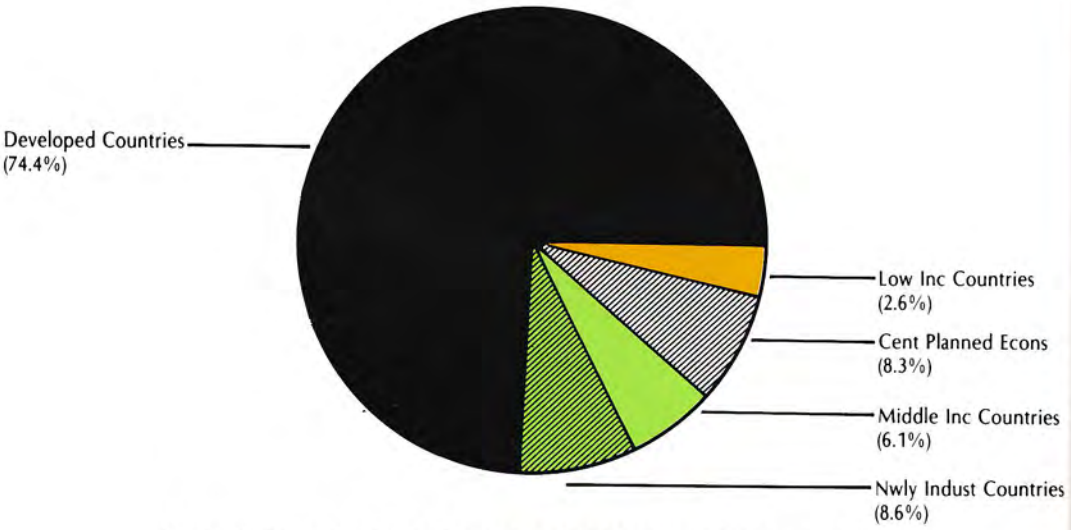
Infogram 1-VIII—World Production and Trade in Meat—*continued*

(B) BEEF AND VEAL—EXPORTS



QUANTITY SHARES OF AV. ANNUAL EXPORTS 1969/71

(2.9 Million Tonnes)



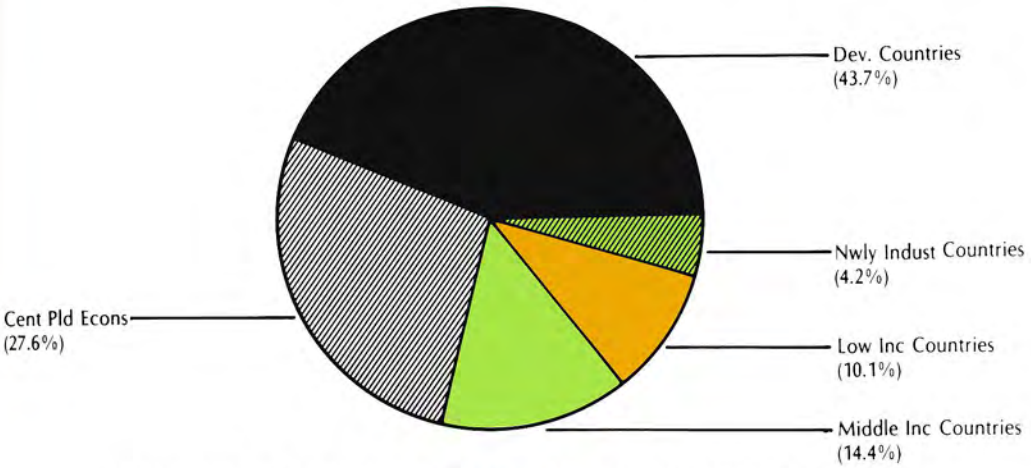
QUANTITY SHARES OF AV. ANNUAL EXPORTS 1979/81

(3.4 Million Tonnes)

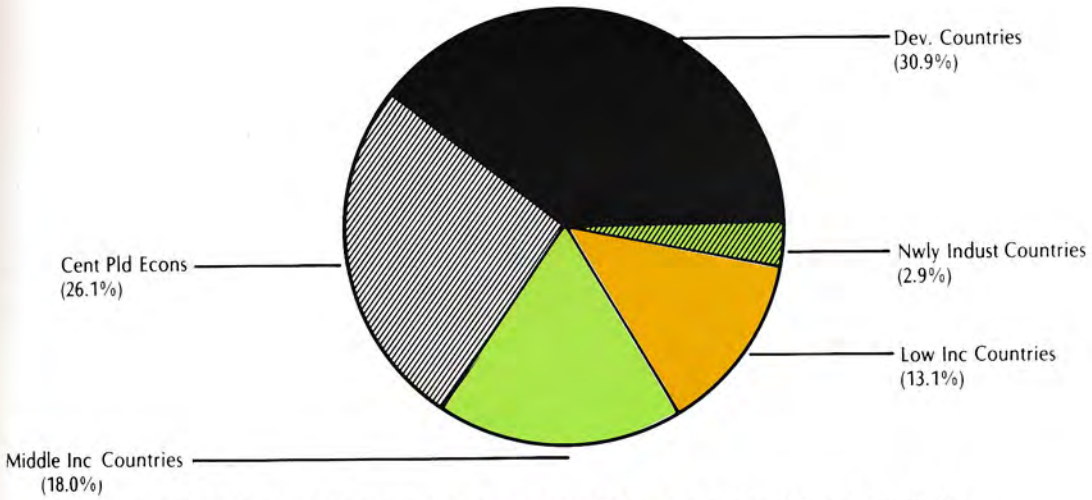
Source: Derived from FAO data (1981).

Infogram 1-VIII—World Production and Trade in Meat—*continued*

(C) MUTTON AND LAMB—PRODUCTION



QUANTITY SHARES OF AV. ANNUAL PRODUCTION 1969/71
(5.7 Million Tonnes)

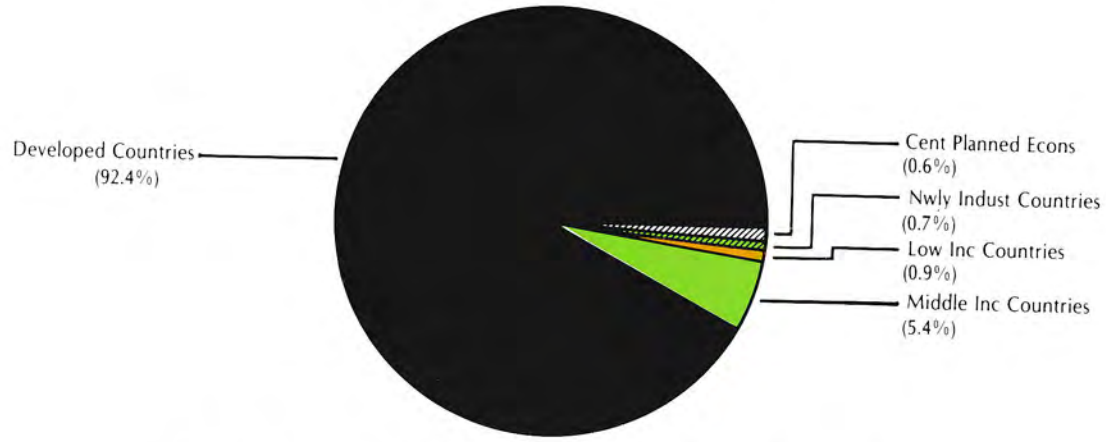


QUANTITY SHARES OF AV. ANNUAL PRODUCTION 1979/81
(5.8 Million Tonnes)

Source: Derived from F.A.O. data 1981

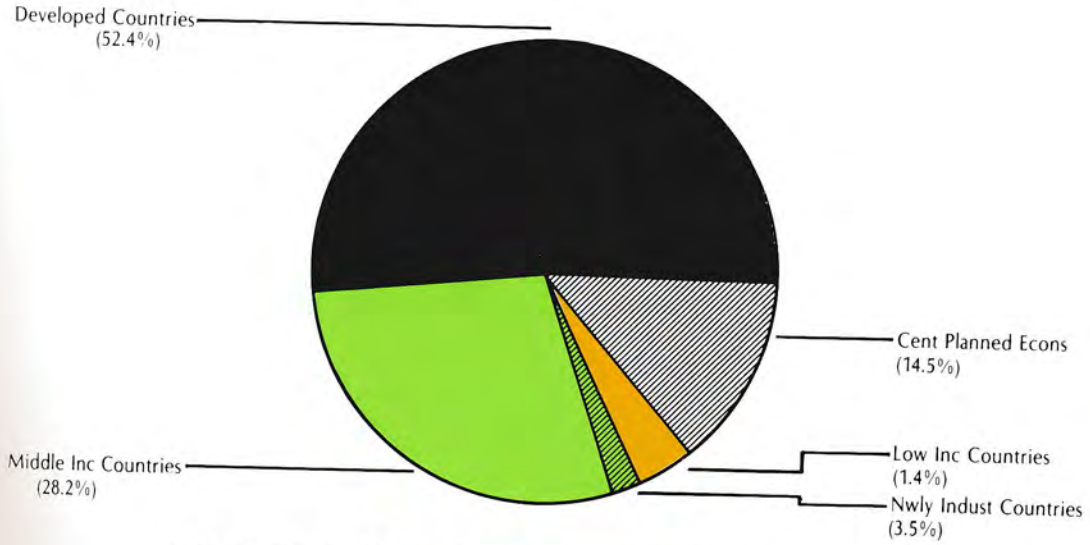
Infogram 1-VIII—World Production and Trade in Meat—*continued*

(C) MUTTON AND LAMB—IMPORTS



QUANTITY SHARES OF AV. ANNUAL IMPORTS 1969/71

(0.7 Million Tonnes)



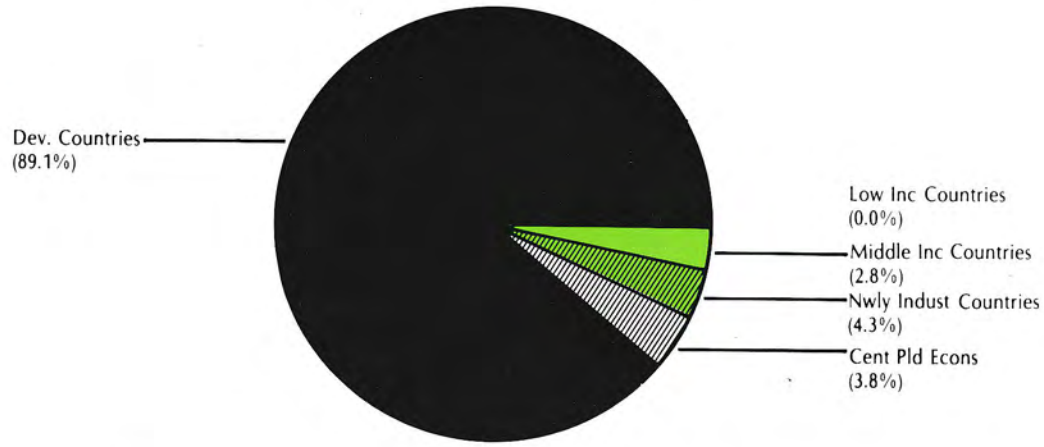
QUANTITY SHARES OF AV. ANNUAL IMPORTS 1979/81

(0.8 Million Tonnes)

Source: Derived from F.A.O. data (1981).

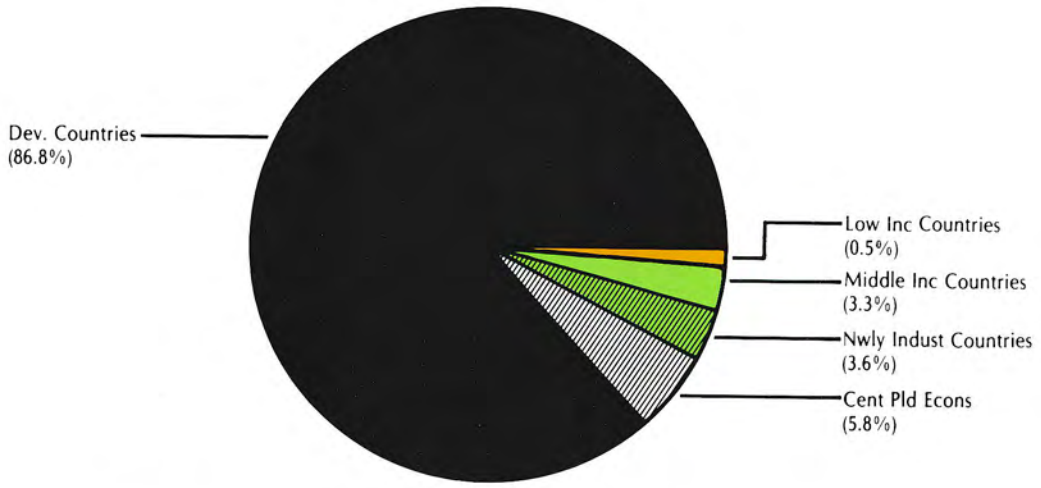
Infogram 1-VIII—World Production and Trade in Meat—*continued*

(C) MUTTON AND LAMB—EXPORTS



QUANTITY SHARES OF AV. ANNUAL EXPORTS 1969/71

(0.7 Million Tonnes)



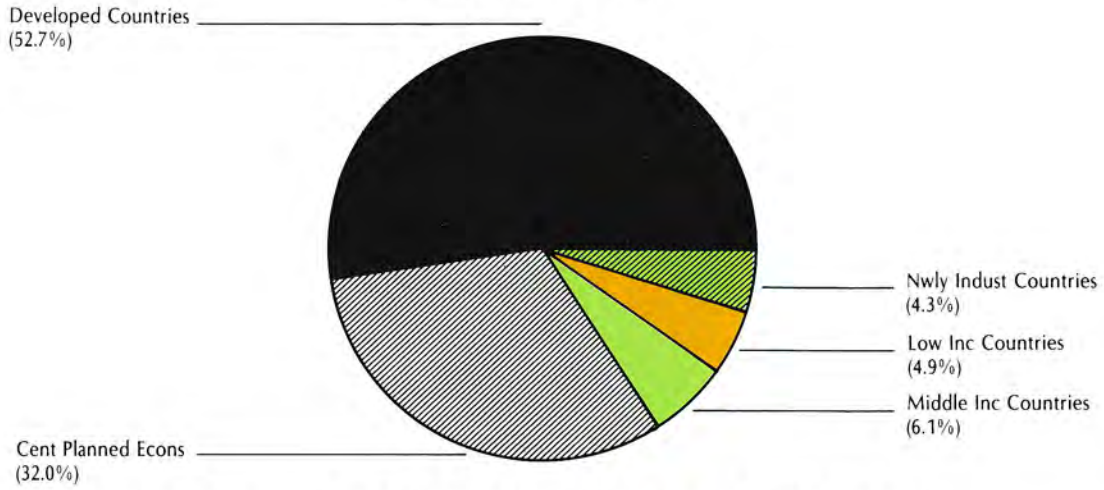
QUANTITY SHARES OF AV. ANNUAL EXPORTS 1979/81

(0.8 Million Tonnes)

Source: Derived from F.A.O. data (1981).

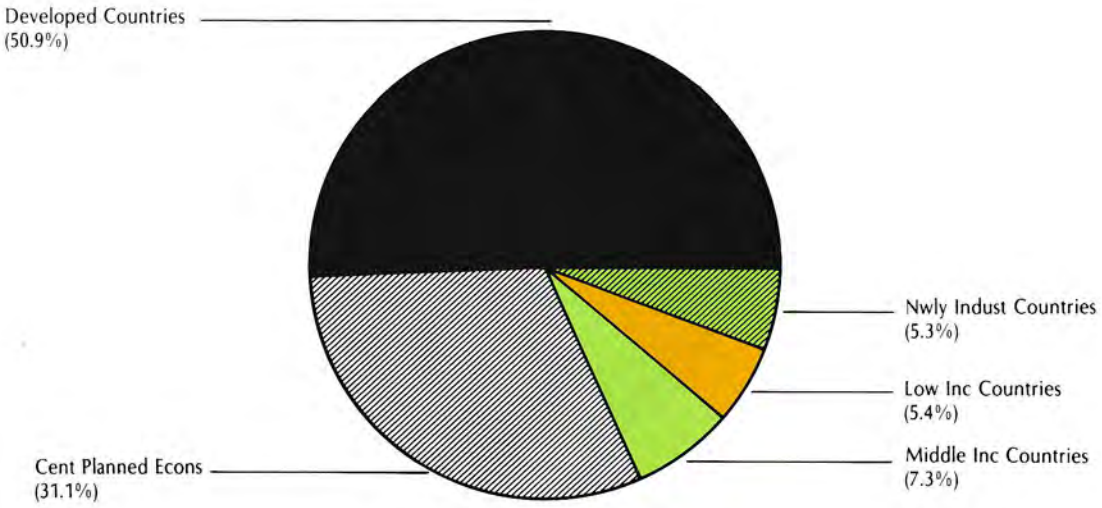
WORLD PRODUCTION AND TRADE IN MILK AND MILK PRODUCTS

(A) MILK PRODUCTION



QUANTITY SHARES OF AV. ANNUAL PRODUCTION 1969/71

(369.6 Million Tonnes)



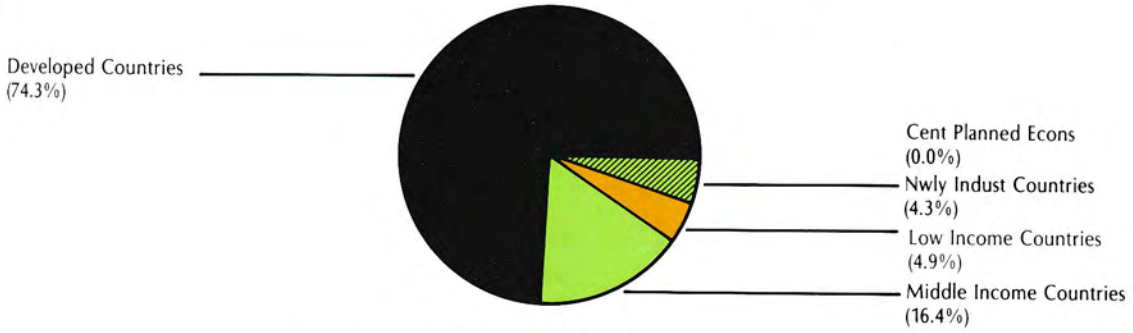
QUANTITY SHARES OF AV. ANNUAL PRODUCTION 1979/81

(435.7 Million Tonnes)

Source: Derived from F.A.O. data (1981).

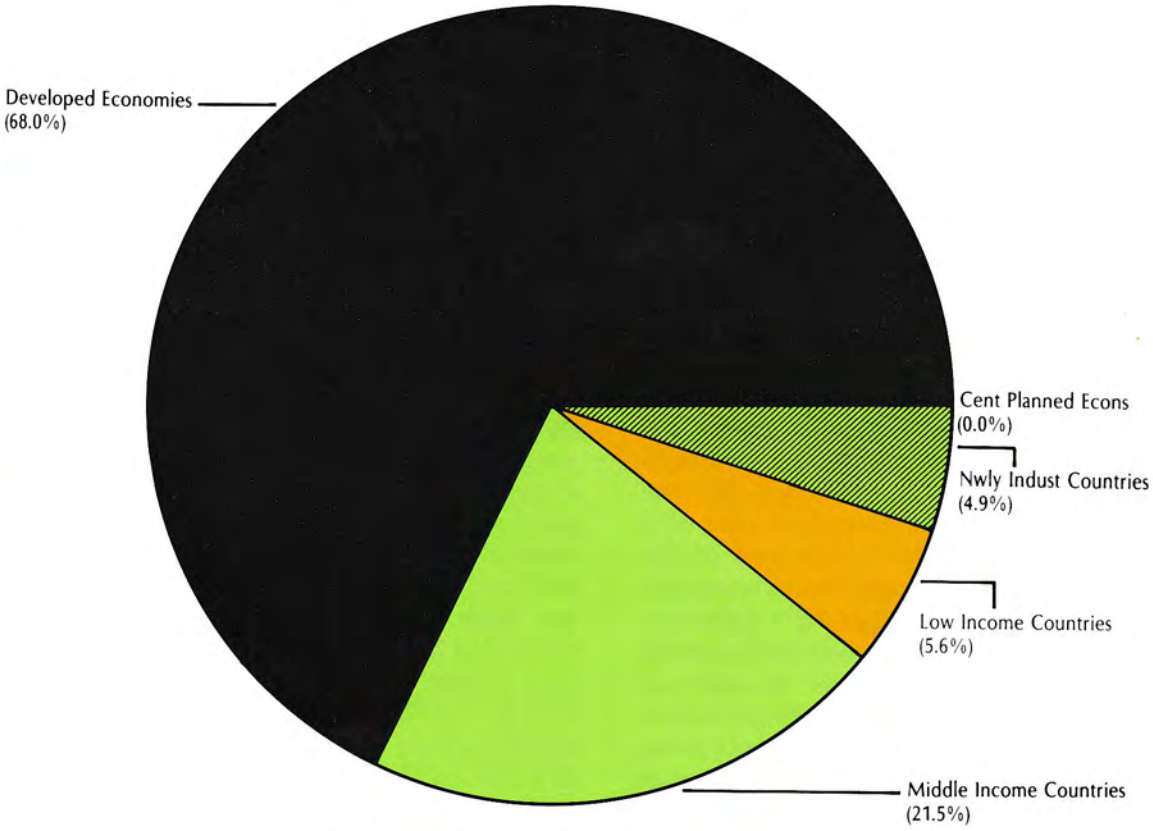
Infogram 1–IX—World Production and Trade in Milk and Milk Products— *continued*

(B) IMPORTS OF DAIRY PRODUCTS AND EGGS



VALUE SHARES OF IMPORTS 1970

($US 2286.3 Million)



VALUE SHARES OF IMPORTS 1980

($US 12580.3 Million)

Source: Derived from F.A.O. data (1981).

1.6.6 Although the greatest tonnage increase in meat production has been in the developed countries (total meat output increased from 50.2 million tonnes in 1970 to 63.7 million tonnes in 1980), their share of world output fell from 48.2% to 45.5%. The share produced in the low-income countries, particularly in Africa, also fell, with fastest rates of growth and increasing shares of world output being found in Japan, the centrally planned economies, the newly industrialised countries and the middle-income countries, particularly in the Western Pacific Seaboard and in the Middle East.

1.6.7 In considering the capacity of the developing countries to increase meat production, it is significant that the developing regions have been estimated to have more than one-half of the world's animals but to be producing only one-fifth of the world's livestock products. This reflects the continuing importance of religious taboos in some countries and the significant extent to which livestock are still used as a source of motive power in many countries. Nevertheless, in the developing regions, output per animal is about one-third that of the rest of the world, and the average feed conversion efficiency of livestock production in the developing countries has been estimated by one authority* to be of the order of 12:1 against 4:1 in the developed countries. As a consequence, the scope for increasing meat production without increasing breeding animals or total feed supplies, through the application of improved management, better nutrition, genetic selection and disease control, is very considerable. It would be even greater if the numerous socio-economic and religious constraints could be reduced.

1.6.8 World cow milk production increased at an average annual rate of almost 1.7% between 1970 and 1980. During this period, the newly industrialised countries, the middle-income countries and most of the low-income countries outside Africa, were able to achieve annual growth rates of around 3.0% per annum or better, and were able to increase their share of total output. Although many developed countries were able to restrain production and reduce their share of world output, this was not the case in Western Europe or in Japan. Both these regions actually increased their share of world output during the decade.

1.7 Agricultural Trade

1.7.1 Although international trade, as measured by the value of total world exports, expanded increasingly rapidly during the 1970s, the 'real' rate of expansion, as measured in volume terms, has slowed down very significantly, particularly since 1973. In the ten years to 1973, the volume of total merchandise exports expanded by an annual average of 8.5%. This growth rate dropped to an average of 3.5% during the period 1973–81. In sharp contrast to this overall trend, and to trends in minerals and in manufactures, the volume of trade in agricultural products expanded more rapidly (4.5%) between 1973 and 1981 than between 1963 and 1973 (4.0%).

* Maurice Lengelle, OECD, Paris

Infogram 1-X

Growth of World Production, 1963–1981
(Average annual rate of change in volume, percentages)

	63–73	73–81	74	75	76	77	78	79	80	81
All commodities	6	3	2.5	–1	7	4.5	4	3.5	1.5	1
Agriculture	2.5	2	1.5	3	2	2	4	–.5	1	2.5
Mining	5.5	1	2	–1.5	6	5.5	–1	3	–2	–3
Manufacturing	7	3.5	3	–1.5	8	5	4.5	5	1	1

Source: GATT International Trade 1981–1982

Infogram 1-XI

Growth of World Exports, 1963–1981
(Average annual rate of change in volume, percentages)

	63–73	73–81	74	75	76	77	78	79	80	81
Total	8.5	3.5	3.5	–3	11	4.5	5.5	5.5	1.5	0
Ag Products	4	4.5	–3.5	5	9.5	2	9	7	3	3
Minerals*	7	–2.5	–2.5	–7.5	4.5	2	1.5	5	–8	–12
Manufacturing	11	5	8.5	–4.5	13	5	5	5	4.5	4.5

* Including fuels and non-ferrous metals

Source: GATT International Trade 1981–1982

1.7.2 The almost world-wide slow-down in general economic activity since 1973 has had a more pronounced impact on world trade than on world production, particularly in the mining and manufacturing sectors. It has affected agricultural production less adversely.

Infogram 1-XII

Changes in the Ratio of Export Growth to Output Growth

	1963–1973	1973–1981
Total	1.42	1.17
Agriculture	1.60	2.25
Mining	1.27	–2.50
Manufacturing	1.57	1.43

Source: Derived from Infograms 1-X and 1-XI

Infogram 1-XII, which presents the ratios between rates of growth of exports and rates of growth of output, shows very clearly how agricultural trade improved its position relative to agricultural production and relative to other sectors of merchandise trade.

1.7.3 Infogram 1-XIII compares the development of world agricultural trade with that of total world merchandise trade (both measured in terms of imports) over the decade 1970/1980. In all regions except Africa, and in the lower-income countries in other regions, the ratio of agricultural imports to total merchandise imports fell during the period. Even the relatively high growth rates for agricultural imports, experienced for example in the newly industrialised countries and the middle-income countries, were still lower than the comparable rates for merchandise trade as a whole.

Infogram 1-XIII

Shares of Total Agricultural Imports

	1970	1980
Meat & Meat Preparations	9.67%	10.00%
Dairy Products	4.55%	5.81%
Cereals & Cereal Preparations	15.23%	16.26%
Fruit and Vegetables	13.64%	13.04%
Feeding Stuffs	3.04%	4.33%

Source: FAO Trade Yearbook (1982)

1.7.4 The shares of both total merchandise imports and agricultural imports purchased by the developed countries fell during the decade. The newly industrialised countries and the middle-income countries increased their shares in both categories, reflecting annual rates of growth significantly above those recorded for other regions. The Pacific Basin as a whole recorded a relatively high rate of growth and an increased share of world merchandise imports, but its share of agricultural imports diminished. The low-income countries more or less maintained their share of both total merchandise imports and agricultural imports during the decade.

1.7.5 There are a number of reasons for the relatively better performance (in terms of relative value) of agricultural production and more particularly agricultural trade over the last decade or so. In fact Infograms 1-X and 1-XI suggest agriculture is less affected than other sectors by either the upward or downward phase of the business cycle. On the other hand, there have been some important structural changes in the pattern of agricultural trade over the period 1970–1980. For example, livestock products, cereals and feeding stuffs all increased their shares of total agricultural trade, mainly at the expense of agricultural raw materials, tropical products and fruits and beverages.

1.7.6 There has also been a significant shift in the flow of agricultural trade. The import shares of the developed economies have declined, for agricultural products generally and for each of the major categories, notwithstanding that intra-EEC trade has increased over the decade. Latin America and the Middle East, amongst the geographic regions, and the newly industrialised countries and middle-income countries amongst the politico-economic groups, led the way, with all these categories recording substantial increases in their shares of imports of cereals and feeds, meat, and to a lesser extent, fruit and vegetables and dairy products. The decline in the import share taken by Asia during the decade, particularly in respect of cereals and cereal preparations, reflects the increasing self-sufficiency of countries such as India.

1.7.7 If trade flows are analysed in terms of volume, rather than value, cereals have shown the strongest trade growth characteristics, with North America showing an annual growth rate of exports of over 10% and increasing its share of world exports during the decade from 40% to over 56% overall. The developed countries increased their share of world exports from 76% to over 80%. However, their share of imports dropped dramatically from 54% to 34%. The centrally planned and middle-income groups of countries and newly industrialised countries all increased their imports at a rate of 10% per annum or better, and all increased their share of world imports. The lower-

income countries, whose share of production decreased over the decade, also saw a significant decline in their share of imports. This had a serious effect on overall food supplies in these countries.

1.7.8 Infogram 1-VIII points to some of the factors underlying the increasing problems which confronted New Zealand during the decade in international meat markets. The developed countries (New Zealand's traditional customers) reduced their share of overall world meat imports from 84% to 66%, with beef and veal declining from 88% to 70%, and mutton and lamb from 92% to 52% of total world imports. At the same time these countries compounded the problem by increasing their share of world exports of all meats from 67% to 75%, and of beef and veal from 71% to 74%. Their share of mutton and lamb exports fell from 89% to 87%. Overall, however, the result was that New Zealand meat exports were confronted by intensified competition and considerable market displacement.

1.7.9 There was, however, strong compensatory growth outside the developed countries with most of these categories averaging around 10% per annum volume growth in meat imports and achieving substantial increases in overall market shares, particularly in respect of beef and veal. Import demand for mutton and lamb increased dramatically in some of the centrally planned, middle-income and newly industrialised countries which achieved significant increases in market shares. However, the value of world imports of sheepmeats increased by less than 2% per annum compared with almost 6% for other meats. Outside the developed countries, the main increases in shares of beef and veal exports were recorded by some centrally planned economies, by African middle-income countries, and Latin American low-income countries. Outside of Europe, the only region to show a significant increase in *exports* of sheepmeats was the Middle East.

1.8 Conclusion

1.8.1 The decade 1970–1980 was a period during which economic development was generally less rapid than during the two previous decades. However, economic growth was more evenly distributed amongst countries, and the developing countries actually achieved a higher collective growth rate than the developed market economies mainly as a result of dynamic growth in a number of oil-exporting and other middle-income countries in the Middle East, Latin America, Western Pacific Seaboard and around the Mediterranean. The changing structure of the world economy, including the centrally planned economies, and consequent changes in the pattern of demand, especially for food, resulted in a substantial acceleration in the rate of expansion of international agricultural trade, notably in cereals and feeds, livestock products and horticultural products.

1.8.2 There is a tendency in New Zealand to look back on the period 1970–1980 as a period of difficulty, dislocation and stagnation in international markets for principal agricultural commodities such as cereals, feeds and livestock products. Yet during this period, many countries were able to achieve dramatic improvements in agricultural export performances—for example, while the nominal value of New

Zealand agricultural exports grew between 1970 and 1980 at less than 13% per annum, the equivalent figure for the U.S.A. was 19%*. Moreover, despite EEC protectionism, US exports to Western Europe grew by 17% per annum over the same period. The implication is that during this period New Zealand was less successful than other countries in adjusting its product/market mix to meet a changing pattern of world demand for agricultural products. The lesson is that in future we must be ready to respond more rapidly. However we cannot respond unless the monitoring systems are in place to enable exporters and industry planners to read accurately the changes that are taking place not only in existing markets but also in emerging and potential markets. The first requirement for a better-planned and more dynamic approach to export marketing is access to more comprehensive and more systematic market intelligence information on which to base longer-term strategies and investment decisions.

* Other examples of countries with higher rates of growth of agricultural exports than New Zealand included: Chile 25.3%, South Korea 23.3%, Thailand 21.1%, EEC 19.0%, Indonesia 18.9%, Malaysia 17.8%, Colombia 17.7%, Brazil 16.9%, Israel 16.2%, South Africa 15.9%, West Europe (non-EEC) 15.4%, Philippines 15.0%, Australia 14.7%, Turkey 14.5%, Argentina 14.3%, Ecuador 14.2%, Pakistan 14.0%, India 13.8%, Yugoslavia 13.4%. Countries with lower rates of agricultural export growth included Japan 10.7%, East Europe/USSR 9.6%, Low-Income Africa 8.9%, Guatemala 8.3%, Sri Lanka 7.4%.

Chapter

2.1 Introduc

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Chapter 2 Likely Trends in Global Demand and Supply for Agricultural Products 1990–2000

2.1 Introduction

2.1.1 In Chapter 1, we have endeavoured to examine the basic demographic and economic (income growth) trends and the changing dietary patterns, which, together with essential political factors, have caused such dramatic changes in the character and location of New Zealand's export markets for agricultural products during the decade from 1970 to 1980. We have also considered the way in which changes in patterns of demand have resulted in changes in patterns of production, and imports and exports. While these changes reflect a global 'economic' response to variations in supply and demand, they also reflect the consequences of national policies which have affected not only population and income growth but also food prices and levels of imports and exports.

2.1.2 New Zealand is likely to remain heavily dependent on pastoral livestock production as a significant element in the domestic economy and as a principal element in the export sector at least until the year 2000. As a consequence, New Zealand agriculture, and indeed the New Zealand economy, will be strongly influenced by trends in world demand, world production, and world trade in temperate zone agricultural products over this period.

2.1.3 Chapter 2 constitutes an attempt to envisage how in each of the main geo-economic regions, the main determinants of demand, and therefore of potential market opportunities, are likely to evolve over the period to 1990 and 2000. The basic population and income projections, based on FAO data, are first presented on a 'global' basis. Then trends in population, incomes and demand are analysed on a regional basis, as a foundation for the more detailed discussion of markets and export prospects for agricultural commodities presented in the ensuing chapters.

2.2 Population

2.2.1 In Chapter 1, it was noted that during the decade 1970—1980, populations tended to increase most rapidly in the lower-income countries and regionally, in Africa, the Middle East, and Latin America. In the Pacific Basin region, the most significant increases were recorded among the middle and lower-income countries in the Western Pacific Seaboard.

2.2.2 The population data and projections depicted in Infogram 1-I suggest that during the decades 1980–1990 and 1990–2000, the rates of population increase will decline in all regions, and particularly in the higher-income countries. As a consequence, by the year 2000, the proportion of the world's population living in what in 1980 were classed as low-income countries, will have risen from 32.1% to 35.2%, the proportion living in the developed market economies will have fallen from 18.2% to 14.9%, and the share held by the centrally planned countries will also have fallen, from 31.6% to 28.3%. The Pacific Basin, although retaining a growth rate of almost 1.7% per annum during the 1980s and almost 1.4% during the 1990s, will have seen its share of world population fall from 17.9% to 17.3%, with only the Western Pacific Seaboard, at around 12%, maintaining its share. The Middle East, Latin America and Africa are all expected to increase their shares of

world population. These population figures are considered in more detail in subsequent sections of this chapter which deal more specifically with each of the main regions.

2.3 Income

2.3.1 The World Bank estimates summarised in Infograms 1-II and 1-III indicate that GNP per capita grew in real terms by 2.9% per annum in the world as a whole between 1970 and 1980. The rate of increase was generally lowest in the richest and poorest countries, with those in-between maintaining the strongest growth rates. This was reflected in the Pacific Basin region where the Western Pacific Seaboard achieved a growth rate of 4.5%, against an average of 3.5% for the region as a whole. High growth rates were also recorded in Eastern Europe, the Middle East and parts of Latin America. The estimates for 2000, depicted in the infograms, are not strictly comparable since they represent (now somewhat dated) forecasts of gross domestic product (instead of gross national product), relate to a slightly different aggregation of countries, and were prepared by FAO rather than by the World Bank. Nevertheless, the forecasts provide a useful and consistent framework within which to consider the broad conclusions outlined in this chapter and the more specific market prospects discussed in subsequent chapters, which are also based primarily on FAO data.

2.3.2 The forecasts suggest that, at world level, economic growth will be maintained during the 1980s and will accelerate towards the end of the century. However, as with population, different rates of growth will result in a different distribution of GDP with the share held by the developed market economies falling from 66.4% in 1980 to 53.8% by 2000, the share of the middle-income and newly industrialised countries increasing from 11.8% to 17.2%, the centrally planned countries also showing a significant increase from 18.2% to 24.6%, and the lower-income countries falling from 3.8% in 1980 to 3.4% by 2000. While the Pacific Basin's share is expected to fall from 40.2% to 34.7%, the Western Pacific Seaboard's share will increase from 10.8% to 12.3%. The Middle East and Eastern Europe are also expected to increase their shares of world income significantly over the next two decades.

2.4 Income per Capita

2.4.1 It can be seen from Infogram 1-III that the conjunction of increasing population and strong economic growth, which were identified in Chapter 1 as being associated with rapid increases in food demand, is likely to be maintained in the West Pacific Seaboard, in the Middle East and in the higher-income countries in Latin America and Africa. But rapid increases in food demand do not translate automatically into an expanding market for imports. Dietary patterns, trends in domestic production and a host of other geographic, social, political and commercial factors need to be taken into account in assessing prospective export markets for New Zealand agricultural products.

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* See also referen

2.5 The Pacific Basin*

2.5.1 For the purposes of this study, the Pacific Basin has been loosely defined to include the countries lying within or bordering on the Pacific Ocean, which would appear for geographic reasons to be potential trading partners for New Zealand. Latin American countries together with China and USSR have been excluded from the region which, nevertheless, still takes in a large and heterogeneous group of countries ranging from some of the world's largest and richest economies, in Japan and North America, to some of the smallest and poorest island economies in Oceania. The region also takes in the centrally planned economies of North Korea, Thailand and Vietnam, the dynamic growth economies of South East Asia, and the developed market economies of Australia and New Zealand. Because of this diversity, the Pacific Basin has been sub-divided into:

(i) North America (Section 2.6)

(ii) Western Pacific Seaboard (Section 2.7)

(iii) Oceania (Section 2.8).

Each of these sub-regions will subsequently be considered in turn.

2.5.2 The Pacific Basin region as a whole accounts for about one-quarter of the world's land area, and less than one-fifth of the world's population. The ratio of agricultural land per inhabitant (1.4 ha's against a world average of 1.2 ha's) obscures the great variation in population pressure and pressure on agricultural land to be found within the region. The ratio varies between 0.2 ha's of agricultural land per inhabitant in the Western Pacific Seaboard, to over 28 ha's per inhabitant in Oceania.

2.5.3 The region enjoys a disproportionally large share of world gross domestic product (approximately two-fifths), although this share is expected to fall to about one-third by 2000. During the decade 1970/1980, the rate of population increase was below the world average, while the rate of increase of GNP per capita was substantially higher (3.5% per annum compared to 2.9%). These trends are expected to continue, and average incomes within the region are likely to remain at more than double the world average.

2.5.4 Levels of food consumption within the region, measured in both calories per day and protein intake per day, are above world levels. The rate of increase during the decade 1970–1980 was generally lower than the world average. However, these average trends disguise considerable differences within the region between the developed countries in which levels of consumption are almost static, and other parts of the region, such as the Western Pacific Seaboard, where increases in the consumption of animal protein were as high as 2.5% per annum.

2.5.5 During the decade, agricultural trade within the region, as measured by the value of agricultural imports, grew at the rate of 14% per annum compared with the world average of 16% per annum. Although representing a significant decline in the agricultural share of total merchandise trade within the region,

* See also references 13, 14 and 15.

Infogram 2–I

The Pacific Basin

Sub-Regions: North America
Oceania
West Pacific Seaboard

Population '000	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80**	**1980/90**	**1990/2000**
Region	770,900	911,409	1,046,137	1.8%	1.7%	1.4%
World	4,318,610	5,158,725	6,044,984	1.9%	1.8%	1.6%
Share of World	17.9	17.7	17.3	–	–	–

Gross Domestic Product $US '000 (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	3,018,582	4,735,551	7,200,069	–	4.6%	4.3%
World	7,514,930	12,076,597	20,767,207	–	4.9%	5.6%
Share of World	40.2%	39.2%	34.7%	–	–	–

Gross Domestic Product/Capita $US (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	3,913	5,255	7,058	3.5%	3.0%	3.0%
World	1,677	2,229	2,962	2.9%	2.9%	2.9%
% of World Average	233%	236%	238%	–	–	–

Land Area 1980 '000 ha's	**Total**	**Arable and Perm. Crop**	**Perm. Pasture**	**Forest**	**Agric. Land/ Capita**
Region	3,083,861	351,159	747,389	999,964	1.4 ha's
World	12,748,619	1,414,675	3,328,734	4,516,339	1.1 ha's
Share of World	24.2%	24.8%	22.5%	22.1%	–

(1) GNP **not** GDP

this reflected particularly dynamic growth in other sectors since the share of total world agricultural imports fell only from 28.7% to 25.2%.

2.5.6 Patterns of production and trade in individual agricultural product categories need to be considered at the sub-regional level in order to draw meaningful conclusions. However, it is interesting to note that during the decade, the rate of increase in cereal production within the region was significantly above the world average, whereas growth in livestock production (meat and milk products) was below the world trend. As a consequence, the region's share of world production of cereals rose, but its share of all

meat, beef and veal, mutton and lamb, and milk production declined between 1970 and 1980.

2.5.7 The region's share of world imports of both cereals and animal products declined during the decade. However, its share of exports increased, in most cases quite dramatically, except for mutton and lamb.

2.5.8 The Pacific Basin is an exceptionally diverse region. Its only common factor is the Pacific Ocean which provides a geographical and logistical basis for the establishment of political and commercial relationships between what is otherwise a heterogeneous collection of countries. These countries display markedly different growth characteristics which are likely to diverge even further during the next two decades. In a certain sense, however, the Pacific Basin might be viewed from New Zealand almost as a microcosm of the trading world. It contains markets with dynamic growth potential, markets which are likely to become increasingly overloaded and competitive, and a number of 'wild-cat' markets such as the centrally planned economies—the whole being overlaid by a complex mixture of trading philosophies.

2.5.9 Despite its complexities, the region offers enormous potential as an expanding market for New Zealand's agricultural exports. The more populous parts of the Western Pacific Seaboard are generally experiencing relatively strong income growth. Current levels of consumption, particularly of livestock products, are low, resources for increasing domestic production are limited, and there is every prospect that increasing demand for food products will be reflected in a vigorous expansion of import demand, either for animal products or for animal feeds.

2.5.10 The increasing significance of the role of feedstuffs in the production of intensive livestock products tends to be overlooked in New Zealand. The dramatic increases in the technical and relative economic efficiency of egg, poultrymeat and pigmeat production in particular have important implications for trade policy and marketing strategies. In 1982 FAO estimated that by 1990, meat from monogastric animals (pigs and poultry) would account for almost two-thirds of total meat consumption. FAO also pointed out that "long distance transport per tonne of pig and poultry products is more expensive than that of the quantities of feed required to produce a tonne of meat or eggs". The only consolation for New Zealand in this conclusion is that for countries intent on developing a livestock sector using imported feedstuffs, it makes better sense to concentrate on pig and poultry products, allowing imports to satisfy demand for other livestock products.

2.5.11 Within the region a crucial question is whether the middle-income and newly industrialised countries will satisfy growing food requirements by importing livestock products or by importing cereals and feeds as a basis for domestic livestock industries. Current trends suggest that there could emerge a divergence of interest, and increasing competition, between 'feed' exporters such as Canada and USA, and livestock product exporters such as Australia and New Zealand. Clearly New Zealand has a particular interest in national policy decisions which will determine how trade will develop and

how this competition is likely to evolve. In fact, this question is likely to become of such critical importance to New Zealand that there could well be a case for New Zealand taking an initiative to establish machinery for what would initially be informal but regular consultations within the region on agricultural policy and agricultural trade policy questions. If events so dictated, it might eventually become desirable to establish a more formal basis for such consultations*.

2.5.12 The type of consultative framework which is envisaged in this proposal stops well short of any kind of customs union or Pacific Free Trade Area for agricultural products. The former Prime Minister of New Zealand, Sir Robert Muldoon, aptly summarised the dangers in going too far down this particular path when he warned that "any regional initiatives which had an exclusive, or inward-looking direction would. . .be positively dangerous to the (Pacific) region's well-being".† Nevertheless, while so many Pacific Basin countries are assessing and re-assessing the prospective role of agriculture in their economies, a good case can be made for stressing economic complementarity within the region. The need is for the establishment of longer-range agricultural policies aimed at the progressive reduction of import restrictions, and the rational sharing of market growth opportunities between domestic and foreign suppliers.

2.6 North America

2.6.1 The two developed market economies of North America account for only 6.1% of world population. However, they occupy 14.4% of the world's land area and generate almost 28% of gross domestic product. Income per capita is very high (over five times the world average), and food consumption is also very high, with calorie intake over 40% above world average and protein intake almost 56% above. However, there is increasing evidence that total food consumption per capita has reached a plateau in North America, particularly in respect of livestock products.

2.6.2 The rate of population growth is well below world average and is expected to decline even further to 0.7% per annum during the decade 1990–2000. By 2000, less than 5% of the world's population will live in North America, and while their share of world GDP will have fallen to about one-fifth, income per capita will have increased to almost 5½ times the world average. If existing trends in dietary patterns continue, only a very small proportion of this additional income is likely to be spent on food, and even less on livestock products.

2.6.3 The importance of agriculture in North America is apparent from an analysis of production and trade figures. The increasing export-orientation is reflected in the strong growth in the export sector

* The work currently being undertaken by the Task Force on Agricultural Trade established by the Pacific Economic Cooperation Conference is relevant to this concept. The Task Force is attempting to determine what should be the regional policy priorities and how these match up with various existing national priorities.

† Sir Robert Muldoon, speech to the East-West Center, Hawaii, 10 March 1984

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Infogram 2–II

North America

List of Countries: Developed Market Economies: Canada, U.S.A.

Population '000	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80**	**1980/90**	**1990/2000**
Region	248,709	274,996	296,043	1.1%	1.0%	0.7%
World	4,318,610	5,158,725	6,044,984	1.9%	1.8%	1.6%
Share of World	5.8%	5.3%	4.9%	–	–	–

Gross Domestic Product $US '000 (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	2,094,802	3,141,274	4,401,192	–	4.1%	3.4%
World	7,514,930	12,076,597	20,767,207	–	4.9%	5.6%
Share of World	27.9%	26.0%	21.2%	–	–	–

Gross Domestic Product/Capita $US (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	8,423	11,142	16,031	2.2%	2.8%	3.7%
World	1,677	2,229	2,962	2.9%	2.9%	2.9%
% of World Average	502%	500%	541%	–	–	–

Land Area 1980 '000 ha's	**Total**	**Arable and Perm. Crop**	**Perm. Pasture**	**Forest**	**Agric. Land/ Capita**
Region	1,834,787	234,974	261,389	610,593	2.0 ha's
World	12,748,619	1,414,675	3,328,734	4,516,339	1.1 ha's
Share of World	14.4%	16.6%	7.9%	13.5%	–

(1) GNP **not** GDP

and the declining significance of imports. The relatively weak growth in imports is apparent from overall trade figures and from the sharp decline in the share of world imports from 15% to 10%; even in areas such as meat production, in which domestic production has been increasing at only a modest rate. On the other hand, exports have increased rapidly in both cereals and livestock products, and the share of world exports in each of these categories has increased dramatically. For example, from 1970 to 1980 the North American volume share of world exports of cereals increased from 40% to more than 56%, its share of world meat exports increased from 7% to 12%, and even its share of beef and veal exports increased from 1% to over 3%.

2.6.4 It seems probable that the conversion of agricultural land to urban and

industrial uses will result in a continuing slow reduction in the total agricultural area. However, much of this reduction will be offset through more intensive land utilisation resulting from increased irrigation, double cropping, etc. It has been suggested[7] that the area in cereals, particularly maize, and in oilseeds is likely to increase, and to a lesser extent the area in food grain production, but the rates of increase will be far slower than during the 1970s, and most of the anticipated increases in production will result from increasing productivity rather than increases in crop area.

2.6.5 North American livestock production is based on the use of high carbohydrate grains and high protein supplements, and production patterns have tended to reflect both short-term fluctuations in feeding costs and longer-term cyclical movements, particularly in relation to beef and pork production. Dairy production is highly regulated in both Canada and the USA and is protected through severe restrictions on imports. Flagging consumption trends have resulted in retrenchment in the beef and pork sectors and increasing emphasis on exports in the poultry sector, and have contributed to the accumulation of large surpluses in the dairy sector.

2.6.6 With little likelihood that per capita consumption levels will increase, it seems probable that even greater emphasis in North America will be placed on the export sector of the agricultural industry. The greatest pressure will be in the cereals and feeding stuffs sector, due to weak domestic demand for livestock products and therefore for feeding stuffs. However, North America could well become a more aggressive exporter of livestock products, particularly in areas such as poultrymeats, in which its cost advantages can best be exploited. This is another factor to be taken into account in establishing strategies for red meat exports from New Zealand. It underlines the potential intensity of the fight for shares of the emerging markets in the middle-income and newly industrialised countries as their consumers consider which forms of animal protein to include in their evolving dietary patterns.

2.6.7 The market in North America for imported food products is likely to become more competitive and more aggressive, with an increasing accent on quality, presentation, distribution and promotion. There is no reason why New Zealand products, particularly those which offer real alternatives to consumers and for which access is unrestricted, should not win and maintain an enhanced market share, but this will involve a degree of professionalism and aggressiveness in marketing which has hitherto not been a striking feature of New Zealand's export marketing performance.

2.7 Western Pacific Seaboard

2.7.1 The Western Pacific Seaboard must be regarded as one of the areas warranting particularly close consideration as a potential market growth area for New Zealand exports, particularly food exports. It is a sub-region characterised for the most part by relatively large and relatively dense populations showing moderate rates of population growth. It accounts for about 12% of world population and roughly the same proportion of annual GDP but its rate of income growth is above the world average and the density

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Infogram 2–III

Western Pacific Seaboard

List of Countries: Low Income: Indonesia
Middle Income: Malaysia, Philippines, Thailand
Newly Industrialised: Hong Kong, Korea (South), Singapore
Developed Market Economies: Japan
Centrally Planned Economies: Kampuchea, Korea (North)

Population '000	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80**	**1980/90**	**1990/2000**
Region	503,927	615,733	727,396	2.2%	2.0%	1.7%
World	4,318,610	5,158,725	6,044,984	1.9%	1.8%	1.6%
Share of World	11.7%	12.0%	12.0%	–	–	–

Gross Domestic Product $US '000 (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	808,474	1,426,455	2,558,100	–	5.8%	6.0%
World	7,514,930	12,076,597	20,767,207	–	4.9%	5.6%
Share of World	10.8%	11.8%	12.3%	–	–	–

Gross Domestic Product/Capita $US (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Av. Region	1,599	2,308	3,330	4.5%	3.7%	3.7%
Av. World	1,677	2,229	2,962	2.9%	2.9%	2.9%
% of World Average	95%	104%	112%	–	–	–

Land Area 1980 '000 ha's	**Total**	**Arable and Perm. Crop**	**Perm. Pasture**	**Forest**	**Agric. Land/ Capita**
Region	406,314	70,222	19,520	238,059	0.2 ha's
World	12,748,619	1,414,675	3,328,734	4,516,339	1.1 ha's
Share of World	3.2%	5.0%	0.6%	5.3%	–

(1) GNP **not** GDP

of population is indicated by the ratio of 0.2 ha's of agricultural land per head of population.

2.7.2 Despite rapid industrial and commercial development in countries such as Japan, Hong Kong and Singapore, agriculture is still of major economic significance in most parts of the region, the main crops being cereals, primarily as a source of food, and tropical products, such as vegetable oils, rubber, coffee, tea and bananas, intended for export. The region is already a net importer of cereals, oil seeds, sugar, citrus, natural fibres, meat and dairy products, and because of its

relative lack of land reserves for potential agricultural development, seems likely to become increasingly reliant on imports to meet its rapidly expanding food requirements, particularly in respect of meat and dairy products.

2.7.3 Levels of food consumption are relatively low throughout the region, particularly consumption of livestock products. Increasing incomes will result in a strong increase in demand for food generally, and it seems probable that the rapid increase in demand for animal products recorded during the decade 1970–1980 will continue as people seek to diversify their diet as a result of increased purchasing power. Demand for meat in particular is likely to increase rapidly: and the way in which this growth will be shared between poultry, pigmeat, beef and sheepmeat is of considerable significance to New Zealand. These shares will depend partly on economic and policy decisions affecting the balance between imported feeds and imported food, and partly on the habits and attitudes which 'new' meat consumers are likely to develop over the next decade or so.

2.7.4 An indication of the 'cross-roads' at which agriculture in the sub-region currently finds itself is conveyed by recent trade figures. The upsurge in demand for agricultural products is reflected in the increase in the share of agriculture in total merchandise imports, notwithstanding significant increases in the production of livestock products (based partially on an increase in domestic production of cereals and partly on increased imports of cereals and other feeding stuffs). The increase in exports, particularly of livestock products, reflects mainly increased intra-regional trade. This is itself an indication of the tentative new patterns of trade which are emerging and which are of increasing importance to New Zealand.

2.7.5 It has been suggested[7] that agricultural production patterns in East Asia over the next two decades are likely to be characterised by:

(i) an 11% increase in the area of agricultural land

(ii) fewer farmers and increased farm size

(iii) accelerating growth in poultry numbers, slower growth in sheep and cattle

(iv) significant increase in milk production.

2.7.6 Continued growth in both agricultural import and export trade is expected with net import requirements rising by 2000 to 53.1 million tonnes of grain, 16.6 million tonnes of oilseeds, 1.2 million tonnes of meat and 2.6 million tonnes of milk and milk products.

2.7.7 In considering the potential of this area as a market for New Zealand products, general trade and trade policy considerations, as well as other factors must be taken into account. Trade is of increasing importance to the region, not only to Japan but also to countries like Singapore, Hong Kong, Malaysia, Indonesia and the Republic of Korea. Although the region enjoyed a positive trade balance in the early 1970s, the balance had become negative by 1980. However, with relatively high foreign exchange reserves, stable economic conditions and dynamic growth, the region as a whole is not likely to become overburdened by balance of payments problems and growth is

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(1) GNP **not** GDP

expected to remain strong, particularly outside Japan.

2.8 Oceania

2.8.1 Oceania includes two developed market economies, Australia and New Zealand, both with efficient commercial agricultural sectors and with levels of production greatly exceeding domestic requirements. As a consequence, both countries are significant agricultural exporters, the main products being dairy products, meat, wool, sugar and wheat. The Pacific Island economies are much less economically developed, have largely subsistence agricultural sectors based on tropical rather than temperate zone products, and are much less involved in world trade.

2.8.2 The uniquely extensive character of the region is reflected in the fact that it accounts for only half a percent of world

Infogram 2–IV

Oceania

Countries included: Developed Market Economies: Australia, New Zealand

Population '000	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80**	**1980/90**	**1990/2000**
Region	18,264	20,680	22,698	1.6%	1.3%	0.9%
World	4,318,610	5,158,725	6,044,984	1.9%	1.8%	1.6%
Share of World	0.4%	0.4%	0.4%	–	–	–

Gross Domestic Product $US '000 (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	115,306	167,822	240,777	–	3.8%	3.7%
World	7,514,930	12,076,597	20,767,207	–	4.9%	5.6%
Share of World	1.5%	1.4%	1.2%	–	–	–

Gross Domestic Product/Capita $US (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region (Only Aust. & NZ)	6,323	7,861	9,507	1.0%	2.2%	1.9%
World	1,677	2,229	2,962	2.9%	2.9%	2.9%
% of World Average	377%	353%	321%	–	–	–

Land Area 1980 '000 ha's	**Total**	**Arable and Perm. Crop**	**Perm. Pasture**	**Forest**	**Agric. Land/ Capita**
Region	842,760	45,963	466,480	151,312	28.1 ha's
World	12,748,619	1,414,675	3,328,734	4,516,339	1.1 ha's
Share of World	6.6%	3.3%	14.0%	3.4%	–

(1) GNP **not** GDP

population, although it occupies over 6% of the land area and generates 1.5% of world GDP. Per capita incomes are more than three times the world average and the region enjoys an abundant 28 ha's of agricultural land per inhabitant, compared to the world average of 1.2 ha's.

2.8.3 The economic and demographic domination of Australia and New Zealand accounts for the very high overall regional food consumption levels. However, in these developed countries, as in North America, there has been a recent tendency towards a decline from the very high levels of animal calories and animal protein consumed in 1970. Population densities in the Pacific Islands are not sufficient to have a significant effect on the regional figures.

2.8.4 Somewhat surprisingly, given the significance of agriculture within the region, increases in production and export volumes in the two key areas of cereals and livestock products have been relatively modest during the decade and in most cases, the region's share in world production and in world exports has decreased; an exception being in the beef and veal sector.

2.8.5 The total trade of the region has increased dramatically over the decade. In nominal value terms, total exports increased by over 16% per annum, and total imports by over 15% per annum. However, as a percentage of total exports, both Australia and New Zealand agricultural exports declined over the decade, particularly over the latter part.

2.8.6 During the period until 2000, the rate of population increase is expected to dwindle from its 1970/80 level of 1.6% per annum to 0.9% per annum. The rate of income growth is projected to be below the world average. However, per capita incomes, while declining slightly in relative terms, will still remain well over three times the world average.

2.8.7 Because of the fragmented and specialised nature of the Pacific Island markets, and the relative size, sophistication and competitive character of the Australian market, the Oceania subregion, although favoured geographically, probably presents as many problems to the New Zealand exporter as does the North American market. There is still considerable scope for increasing consumption of agricultural products in the Pacific Islands, and despite the small size of the populations concerned, there should emerge countless small-scale opportunities for individual New Zealand exporters, particularly for processed agricultural products, because of relative economies of scale. Although there seems no reason to expect a rapid expansion of demand for agricultural products in either Australia or New Zealand, changing production trends associated with changes in trade patterns could result from closer economic relations between Australia and New Zealand as a result of the CER agreement*. Moreover the implications of CER for third country suppliers and potential suppliers have not yet been fully assessed.

2.8.8 It has been suggested that as a result of CER, there could be consider-

* Closer Economic Relations Agreement (1982) between Australia and New Zealand

able expansion of horticultural trade between Australia and New Zealand. Beyond opportunities for this kind of rationalisation, Oceania is unlikely to offer major volume growth market opportunities for New Zealand agricultural exports.

2.9 Western Europe

2.9.1 Western Europe consists of the ten members of the European Economic Community and other developed market economies in Scandinavia and Central Europe and the Iberian Peninsula. All these countries are highly industrialised with commercial agricultural sectors which in many cases are highly productive although accounting for a relatively small share of gross domestic product. The region produces a large share of the world's output of grain, livestock products, and fruit and vegetables and is a major importer and exporter of agricultural products generally.

2.9.2 Although Western Europe currently accommodates just over 9% of world population, the annual rate of increase has been only 0.4% from 1970–1980 and is expected to drop to 0.3% by the end of the century, when Western Europe's share will have fallen to under 7%. The region accounts for over 27% of world GDP, and per capita incomes are more than three times the world average. The rate of increase in per capita income is expected to accelerate during the 1980s and 1990s. However, by 2000, the share of world GDP will have fallen to about 21%. A major feature of Western Europe is its density of population and intensity of resource use. It supports 9% of world population on less than 3% of the land area, and its ratio of agricultural land per inhabitant is 0.5 ha's, compared with the world average of 1.2 ha's.

2.9.3 Although food consumption levels in Western Europe, already at high levels, continued to increase during the decade from 1970, 1980 average daily calorie and protein intakes were still lower than the equivalent 1970 levels in North America. This is significant because from 1980, consumption of animal products continued to increase quite rapidly in Western Europe, whereas in North America, there has been some evidence to suggest that consumption of animal products peaked during the 1970s and towards the end of the decade was showing a tendency to decline.

2.9.4 Despite the rapid development of its agricultural industries, Western Europe remains a substantial importer of agricultural products. It still accounts for over 50% of world agricultural imports and these imports represent 18% of total Western Europe merchandise imports. However, its share of world production has tended to increase and its share of imports of major agricultural products has fallen. Its import share would be even lower if intra-EEC trade were not included in trade statistics. Western Europe's share of total world agricultural exports have remained more or less constant and its share of total world cereals exports actually fell between 1970 and 1980.

2.9.5 Food production increased faster than population during the 1970s and this trend is expected to continue, particularly within the EEC-10 (or an expanded EEC including Spain and Portugal), over the next two decades. Growth in food consumption will be influenced more by

Infogram 2–V

Western Europe

List of Countries: Developed Market Economies:
EEC: Belgium, Denmark, France, Germany (West), Greece, Ireland, Italy, Netherlands, United Kingdom
Non-EEC: Austria, Finland, Gibraltar, Iceland, Malta, Norway, Portugal, Spain, Sweden, Switzerland, Yugoslavia

Population '000	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80**	**1980/90**	**1990/2000**
Region	368,955	381,930	395,184	–	0.4%	0.3%
World	4,318,610	5,158,725	6,044,984	1.9%	1.8%	1.6%
Share of World	8.5%	7.4%	6.5%	–	–	–

Gross Domestic Product $US '000 (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	2,072,228	3,034,704	4,399,466	–	3.9%	3.8%
World	7,514,930	12,076,597	20,767,207	–	4.9%	5.6%
Share of World	27.6%	25.1%	21.2%	–	–	–

Gross Domestic Product/Capita $US (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	5,178	7,112	9,768	–	3.2%	3.2%
World	1,677	2,229	2,962	2.9%	2.9%	2.9%
% of World Average	309%	319%	330%	–	–	–

Land Area 1980 '000 ha's	**Total**	**Arable and Perm. Crop**	**Perm. Pasture**	**Forest**	**Agric. Land/ Capita**
Region	372,905	95,075	71,355	125,505	0.5 ha's
World	12,748,619	1,414,675	3,328,734	4,516,339	1.1 ha's
Share of World	2.9%	6.7%	2.1%	2.8%	–

(1) GNP **not** GDP

income trends than by population growth. However, it seems likely that over the next 15 years and making due allowance for changes in consumer tastes and preferences, the trend in dietary patterns which emerged in North America during the 1970s would well be repeated in Western Europe, with a consumption plateau being reached, at least in respect of animal products. Such a development could add to other increased political pressures for changes in domestic agricultural policies within the region, particularly in respect of the EEC Common Agricultural Policy.

2.9.6 Western Europe accounts for such a significant share of world production and trade in agricultural products that trends in this region will have major implications for other countries and regions, particularly those such as New Zealand with a significant importing or exporting interest in temperate agricultural products.

2.9.7 Moreover, agriculture in Western Europe tends more than other regions with major agricultural trading interests, to be insulated from international trends in supply and demand. It is therefore less sensitive to external market pressures than the agricultural sectors in other major trading regions. For these reasons, future trends in agricultural production and markets in Western Europe are likely to be determined to a large extent by non-market considerations and in particular, by the type of compromise which is eventually reached between rural, social and welfare objectives, budgetary and financial considerations, consumer interests and international obligations. It is not possible in a paper of this type, to attempt a detailed analysis of all facets of European policy and their possible impact on European and world trends in agricultural products. In general terms, however, while the Common Agricultural Policy is likely to become increasingly subject to financial and other non-agricultural constraints, new market opportunties are unlikely to emerge in Europe for traditional New Zealand products. This is not to say that there will not be exciting opportunities for specialised products to meet particular market requirements. However, overall competition for a sluggish European food market is likely to become increasingly intense and aggressive, and the question is likely to become increasingly one of retaining overall market shares rather than looking for expansion.

2.9.8 Of perhaps more significance to New Zealand, is whether a cut-back in European agricultural support could be expected to have any effect on heavily subsidised EEC exports of temperate agricultural products which currently compete fiercely with New Zealand products in many markets in various parts of the world. In the short term, this competition is likely to continue, unabated. In the longer term, for a mixture of political and commercial reasons, we believe that European pressure on third markets could diminish. However, much depends on the outcome of current debates involving the level of the budget, the level of agricultural support, and arrangements involving third countries.

2.9.9 In summary, irrespective of New Zealand's share of the Western European market for agricultural products, Western Europe and its agricultural policies and production trends are likely to continue to have a major impact on New Zealand's agricultural export performance.

2.10 Eastern Europe/USSR

2.10.1 The Eastern Europe/USSR region is dominated by the USSR, which alone occupies one-sixth of the global land mass, has 6% of the world's population, and is the second largest economy in the world (measured by GNP).

2.10.2 The region as such occupies 18% of the world's land area, accommodates

Infogram 2-VI

Eastern Europe/USSR

List of Countries: Centrally Planned Economies: Albania, Bulgaria, Czechoslovakia, Germany (East), Hungary, Poland, Roumania, USSR

Population '000	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80**	**1980/90**	**1990/2000**
Region	380,539	412,825	440,668	0.8%	0.8%	0.6%
World	4,318,610	5,158,725	6,044,984	1.9%	1.8%	1.6%
Share of World	8.8%	8.0%	7.3%	-	-	-

Gross Domestic Product $US '000 (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	973,014	1,666,111	4,197,267	-	5.5%	9.7%
World	7,514,930	12,076,597	20,767,207	-	4.9%	5.6%
Share of World	12.9%	13.8%	20.2%	-	-	-

Gross Domestic Product/Capita $US (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	2,557	4,035	6,167	4.5%(2)	4.7%	4.3%
World	1,677	2,229	2,962	2.9%	2.9%	2.9%
% of World Average	152%	181%	208%	-	-	-

Land Area 1980 '000 ha's	**Total**	**Arable and Perm. Crop**	**Perm. Pasture**	**Forest**	**Agric. Land/ Capita**
Region	2,326,876	277,831	388,988	949,251	1.8 ha's
World	12,748,619	1,414,675	3,328,734	4,516,339	1.1 ha's
Share of World	18.3%	19.6%	11.7%	21.0%	-

(1) GNP **not** GDP
(2) Hungary & Roumania only

about 9% of total population, and generates an estimated 13% of world gross domestic product. It has a ratio of agricultural land to population of 1.8 ha's/capita, compared to the world average of 1.2 ha's/capita.

2.10.3 Although the region historically has been a major agricultural producer, the problems which have emerged in this sector are reflected in the region's production and trade figures. Its share of total world agricultural imports increased during the decade 1970–1980, imports of cereals rising from 10% to 23% of world imports (by volume) over the period. At the same time, its share of world cereals production fell from 18.8% to 15.6%. Its shares of world meat production and milk production also declined. Despite problems in the agricultural sector, incomes per capita within the region have appar-

ently continued to increase at a rate significantly higher than in the rest of the world, and food consumption per capita, already reasonably high, has also continued to increase, with per capita consumption of animal products growing very rapidly at around 2% per annum.

2.10.4 The USSR, and the region as a whole, have assumed a dominant position in recent years in international markets as importers of both feed grains and meat and dairy products. As a consequence, future trends in the region's agricultural production and in its demand for imports will have a major effect on New Zealand's export performance in the livestock products categories.

2.10.5 In the USSR, agriculture has been growing at a decreasing rate and in the past has persistently failed to meet the targets laid down in successive five-year plans. In May 1982, the Soviet Government announced a new longer-term Food Programme, with a 1990 horizon and the objectives of ensuring regular food supplies, improving the diet and reducing imports, particularly of feed grains. In evaluating this Programme, the OECD has commented that: "The Food Programme does not involve a profound re-organisation of the agricultural sector. Hence the prospect during the 1980s is for Soviet agriculture to continue to fall short of the targets laid down for it. Grain is likely to come closer to target than meat, and as a result, grain imports, both for feed and direct consumption, will probably be lower than in recent years. . ."[8]

2.10.6 The need to increase animal production and in particular the supply of meat, is the central issue of Soviet agricultural policy. The emphasis on increasing animal production has led to larger shares of grain production being used for animal feed and the production of feed grains is given a high priority in the present plan, with emphasis on maize, barley and leguminous grain. However, the aim to raise overall crop yields must be placed in the context of extreme physical and climatic variations between regions and between seasons which have induced increased production instability as more marginal land has been brought into use.

2.10.7 Animal production increased substantially during the 1960s but in recent years has tended to stabilise. Moreover, the Food Programme does not provide for a sufficient increase in production investment for its achievements to be met, even in the poultrymeat area where the problems appear less complex. On the assumption that meat production will fall well short of planned levels, requirements for feed grains will also be reduced. If, as suggested by the OECD report, meat production were to reach only 18 million tonnes by 1990 instead of the planned 21.5 million tonnes, the Soviet Union could come close to self-sufficiency in grains by the end of the present decade. On balance, however, a continuation of increased consumer demand for meat, re-exports to other Eastern-Bloc countries, and continuing shortfalls in domestic grain production appear likely to compel the Soviet authorities either to continue to import substantial quantities of feed grains or to step up meat imports. Either way, there appears little chance that meat consumption will attain the target level of 78–82 Kgs per capita per annum by 1990. There

has been some suggestion that heavy demands on hard currency reserves in order to finance food imports could cause a reduction in USSR activity as a wool buyer, with significant consequences for wool prices.

2.10.8 In other parts of Eastern Europe, economic growth has been sustained during the decade 1970–1980 at rates generally higher than in the developed market economies. However, several of these countries have encountered serious external debt problems and a growing imbalance between energy production and consumption. Overall, the prospects are for slower income growth and significant changes in development strategies and in economic structures over the next 15 years or so.

2.10.9 While food consumption per capita is high compared with most other parts of the world, growing incomes, lack of other consumer goods for purchasers, and the policy of subsidising food prices have collectively exerted particularly heavy pressure on available food supplies. The livestock industry grew, but domestic feed production could not keep pace and more grain imports were necessary. This in turn caused debt financing problems, food rationing and a series of serious socio-economic debates, particularly relating to food price levels. As a consequence, despite expected moderate population increase and income growth over the next two decades, it seems probable that increased food consumption and import policies will be determined more by pricing policies and their success in restraining consumption, than by the success or otherwise of domestic production programmes.

2.11 Middle East

2.11.1 Although geographically concentrated, the Middle East region is almost as varied as the Pacific Basin in the range of physical, social, economic and political conditions which it encompasses. It is a region which, as a result of successive oil shocks, has suddenly achieved a new and significant economic role in international affairs. On the other hand, it remains a region of enormous contrasts, and considerable political instability. Economic development is a major theme throughout the region and agricultural development has more recently become a major element in overall development strategy. In modern times, the region has been food deficient and during the last decade it has become a major importer as food demand, driven by rapidly rising incomes, has increased.

2.11.2 Unfortunately, full economic data for this region are not available, particularly in respect of Iran and Iraq. Overall the region accounts for just under 4% of world population and world gross domestic product and occupies 5.3% of the world's land area. Gross Domestic Product per capita ($1,667 in 1980) was about world average, and the region has a ratio of 1.9 ha's of agricultural land per inhabitant compared with the world figure of 1.2 ha's per inhabitant. However, in the Middle East, these figures disguise major intra-regional differences. Saudi Arabia, with a population of almost 9 million (1980) had a GDP per capita of US$11,950 and 9.6 ha's of agricultural land per inhabitant. Israel's 3.9 million inhabitants had a per capita GDP of $4,540 and only 0.3 ha's of agricultural land per inhabitant. Yemen had a population of 5.8

Infogram 2-

The Middle

List of Countri

Population '0	
Region	
World	
Share of Wor	

Gross Domes	
Region	
World	
Share of Worl	

Gross Domes	
Region	
World	
% of World A	

Land Area 198 '000 ha's	
Region	
World	
Share of Worl	

(1) GNP **not** GDI

million, GDP
ha's of agricu

2.11.3 Food
has develope
consumption
measured by
intake and ani
ing at better th

Infogram 2-VII

The Middle East

List of Countries: Low Income: Afghanistan, Yemen (Arab Republic), Yemen (Demo.)
Middle Income: Bahrein, Cyprus, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates
Developed Market Economies: Israel

Population '000	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80**	**1980/90**	**1990/2000**
Region	154,441	205,210	262,443	2.6%	2.9%	2.5%
World	4,318,610	5,158,725	6,044,989	1.9%	1.8%	1.6%
Share of World	3.6%	4.0%	4.4%	-	-	-

Gross Domestic Product $US '000 (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	276,354	638,304	1,708,552	-	8.7%	10.4%
World	7,514,930	12,076,597	20,767,207	-	4.9%	5.6%
Share of World	3.7%	5.3%	8.2%	-	-	-

Gross Domestic Product/Capita $US (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	1,667	2,962	5,264	4.5%	5.9%	5.9%
World	1,677	2,229	2,962	2.9%	2.9%	2.9%
% of World Average	99%	133%	178%	-	-	-

Land Area 1980 '000 ha's	**Total**	**Arable and Perm. Crop**	**Perm. Pasture**	**Forest**	**Agric. Land/ Capita**
Region	681,242	70,347	219,552	48,205	1.9 ha's
World	12,748,619	1,414,675	3,328,734	4,516,339	1.1 ha's
Share of World	5.3%	5.0%	6.6%	1.1%	-

(1) GNP **not** GDP

million, GDP per capita of US$430 and 1.7 ha's of agricultural land per capita.

2.11.3 Food consumption in the region has developed rapidly since 1970, with consumption of animal products (as measured by per diem animal calorie intake and animal protein intake) increasing at better than 1.5% per annum, against an increase in general food consumption of about 1.0% per annum.

2.11.4 The importance of agricultural imports to the Middle East is indicated by the increase in the region's share of world agricultural imports from 1.7% in 1970 to 4.7% in 1980. The increase was even more dramatic in respect of certain products.

For example, while the region's share of world cereals imports increased from about 4.5% to about 6.5%, its share of meat imports rose from 1.8% to 10.6%, beef and veal from 0.4% to 5.0% and mutton and lamb from 1.6% to 24.7%. Production also increased, but the major part of the increase in demand has been met by increased imports.

2.11.5 It is apparent from the projections of population and income growth that the Middle East can be expected to become an increasingly important area in terms of economic growth, trade, and food demand. While its share of world population will increase from 3.8% in 1980 to 4.5% by 2000, its share of world GDP will have more than doubled from 3.7% to 8.2% and per capita incomes will have increased at almost double the average world rate of increase.

2.11.6 Although average per capita food consumption is already above the world average over much of the region, it seems probable that demand for food will continue to grow strongly in response to income growth and that in particular, the rapid increase in demand for animal products will be maintained as a result of more equitable distribution of income as well as higher incomes. Since the region is heavily dependent on imported food supplies, the current heavy capital investment in infrastructural development in the region and the consequent improvement in distribution and storage facilities will also contribute significantly to a sustained growth in demand for imported food products.

2.11.7 There are three factors in particular which could exert an important influence on the shape and character of future import demand.

2.11.8 The first is the potential for expansion of domestic agricultural production within the region. Although the region encompasses a relatively large land area, the arable proportion is relatively small, the climate is for the most part unfavourable to agriculture, and lack of water is a severe impediment to expanded production. Although major agricultural development projects are now underway, in particular to increase irrigation and to improve the efficiency of production, it seems unlikely that even a relatively rapid rate of increase of domestic production in the region would have a significant dampening effect on overall import demand over the next two decades.

2.11.9 The second factor will be the set of policy and economic conditions which will determine the feed-food mix in the basket of imports, particularly if, as seems probable, the main element in increasing food demand is demand for livestock products. It seems likely that priority in domestic development programmes will be given to those sectors which can make the most effective use of imported feedstuffs—poultry in particular and pigmeat, where this is not subject to religious taboo. In some parts of the region, substantial investment in horticultural development is taking place. Milk production could also receive priority although consumption is in any case expected to outrun production, resulting in what could be a doubling of import demand by 2000. Increases in beef production and in the sheep flock are likely to be based to a greater extent on the development of indigenous resources and

are therefore likely to occur at a slower rate. On balance it would seem that the question of feed imports or livestock product imports is likely to be of less relevance in the Middle East than in some other food deficit areas, e.g. the Western Pacific Seaboard. Demand for food and in particular for animal products, is likely to grow more rapidly than production, whether this production is based on indigenous resources or imported feeds, and import demand will continue to expand as a consequence.

2.11.10 The third factor is the political and economic stability of the region, particularly in view of its past record. The rapid growth and expansion of the economic base within the region following the OPEC oil price rises in 1973 caused serious political and economic management problems. These problems were accentuated by the undeveloped state of many of the economies concerned and had significant repercussions for relationships with what were, in most instances, new trading partners such as New Zealand. Over the subsequent decade, however, economic priorities have been identified, more appropriate administrative systems have been installed, infrastructure has improved and technical and managerial experience has accumulated. Moreover, greater economic stability has not so far been accompanied by any marked loss of economic dynamism. In contrast, the political situation will remain an unpredictable element. Suffice it to note that while wars may cause temporary dislocations of trading lines, they do not suddenly suppress a nation's appetite for food. And this appetite, and the economic wherewithal to satisfy it, seem now to be well established in the Middle East region.

2.11.11 The Middle East is already a significant market for a range of New Zealand food products. However, it is a region which is developing rapidly and in which consumer preferences and dietary patterns are still being formed or are still evolving. Consequently, it is particularly important that marketing strategies for this part of the world should be forward-looking and based on anticipated consumer preferences and requirements rather than what is being accepted today.

2.12 Central Asia

2.12.1 Central Asia, which includes in China and India the two most populous countries in the world, accounts for a massive 42% of world population. The intensity of habitation in the region is reflected in the fact that it accommodates two-fifths of the world's population on only one-eighth of its land area, and with less than a quarter of its arable and permanent crop area. In fact, the ratio of agricultural land to population is only 0.4 ha's against a world average of 1.2 ha's per inhabitant. The region is one of the poorest in the world and generated only 7% of world GDP in 1980. The standard of living is low, and GDP per capita was only 17% of the world average. Food supply per capita is below world average, with particularly low levels of consumption of animal products.

2.12.2 Agriculture is of major importance to the region's economy and largely as a result of progress in the agricultural sector, growth of gross domestic product has accelerated to some extent in recent

Infogram 2-VIII

Central Asia

List of Countries: Low Income: Bangladesh, Burma, India, Laos, Maldives, Nepal, Pakistan, Sri Lanka
Centrally Planned Economies: China, Mongolia

Population '000	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80**	**1980/90**	**1990/2000**
Region	1,806,591	2,144,102	2,465,925	2.0%	1.7%	1.4%
World	4,318,610	5,158,725	6,044,984	1.9%	1.8%	1.6%
Share of World	41.8%	41.5%	40.8%	-	-	-

Gross Domestic Product $US '000 (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	525,129	876,461	1,418,871	-	5.3%	4.9%
World	7,514,930	12,076,597	20,767,207	-	4.9%	5.6%
Share of World	7.0%	7.3%	6.8%	-	-	-

Gross Domestic Product/Capita $US (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	288	394	538	2.9%	3.2%	3.2%
World	1,677	2,229	2,962	2.9%	2.9%	2.9%
% of World Average	17%	18%	18%	-	-	-

Land Area 1980 '000 ha's	**Total**	**Arable and Perm. Crop**	**Perm. Pasture**	**Forest**	**Agric. Land/ Capita**
Region	1,589,316	314,453	364,609	259,315	0.4 ha's
World	12,748,619	1,414,675	3,328,734	4,516,339	1.1 ha's
Share of World	12.5%	22.2%	11.0%	5.7%	-

(1) GNP **not** GDP

years and food production per capita has been maintained despite population growth. The improvement in agricultural performance is reflected in the increase in the share of world cereal production and meat production which took place between 1970 and 1980 and in the decline in the world share of both imports and exports of cereals as self-sufficiency levels have increased. The increase in meat imports is an indication of the gradual improvement in per capita incomes within the region as a whole.

China

2.12.3 In considering prospects for the region during the next two decades, it is preferable to consider China separately.

This is because of its size (one-fifth of the world's population) and because of significant recent changes and developments in its policies. These have been intended to encourage expansion of exports of a wide range of commodities, including some agricultural products, while attempting to limit growth of agricultural imports, in order to contain the size of the trade deficit. Recent policy has also been directed towards the use of the price mechanism rather than quotas to regulate supply and demand, and in the agricultural sector, has tended to encourage the production of industrial crops used as a basis for export manufacture.

2.12.4 The 1980 "10-Year Economic Plan for Agriculture" established a 4% per annum target growth rate for the agricultural sector as a whole. The Plan called for an increase in grain production as well as in industrial crops. Increases in grain production will be based on the development of ten regional centres and will involve both land development projects, including reclamation and irrigation, and efforts to improve very low average crop yields through increased mechanisation and fertiliser use, plant-breeding programmes and improved management techniques. The Plan also called for increased cotton and wool output and expanded oilseed and textile production.

2.12.5 Expansion of the livestock industry was also a high priority, particularly in the permanent pasture area, where there is considerable potential for land development and pasture improvement. China already has a large pig herd (over 300 million head), but productivity and slaughter rates are particularly low. It has been estimated that if the slaughter rate were raised from 84% to 90% (it is now 150% in USA), and the yield were to be increased by 0.1 Kg from 59.9 Kg to 60.0 Kg, this would be equivalent to an additional two million tonnes of pork.

2.12.6 Although the rate of population increase is declining, China will still have 275 million more mouths to feed by the year 2000. At the same time, the projections of economic growth and shifts in policy suggest incomes will continue to increase. This will lead to an upsurge in food demand and almost certainly a change in dietary patterns involving greater amounts of livestock products. For balance of payments reasons and other considerations, the Chinese government is likely to attempt to dampen the rate of increase in demand for consumer goods, especially imported foodstuffs. As a consequence, while China is expected to remain a large importer of feed and food grains, imports of meat and other non-staple foods are not likely to increase as rapidly as might appear from population, income and domestic production projections.

Remainder of the Region

2.12.7 Although the economies of Bangladesh and some of the smaller countries of the region such as Nepal and Sri Lanka have, if anything, tended to go backwards over the decade 1970–1980, for the region as a whole the outlook until 2000 is not so depressing. The rate of population growth is expected to continue to decline, at least in part as a result of government measures to curb population growth. The non-agricultural sectors are expanding and industrialisation is proceeding. GDP and GDP per capita

should both increase more rapidly than in the rest of the world.

2.12.8 The agricultural economy, which is still of major importance to the region, is continuing to improve in structure and in productivity, although it remains highly vulnerable to the vagaries of climate. Marketing and processing structures are being developed, research and extension services are already operating more effectively and, particularly in India, effective food reserve policies and programmes are being established.

2.12.9 Increased irrigation, mechanisation and fertiliser application, coupled with the use of improved seeds, resulted in a 20% increase in cereal crop yields over the decade from 1970 to 1980, notably in wheat (30%) and rice (14%). Despite these gains, crop yields still remain far below world average and further gains can be expected.

2.12.10 Although meat is a relatively unimportant element in the diet, meat and milk production increased quite rapidly during the 1970s. It has been estimated that in South East Asia* meat production could reach 4.2 million tonnes by 2000, more than a two-fold increase, while milk production, which increased by 39% between 1970 and 1980, is projected to increase by 70% to reach 72.2 million tonnes by 2000.

2.12.11 Levels of per capita food consumption are quite low in the region—the lowest in the world for meat (except in Mongolia), eggs and oilseeds, and even cereal consumption is only about 60% of world average. Population expansion and rising income levels will trigger a strong increase in demand for food. Meat consumption, in particular, is likely to increase at about 2% per annum during the next two decades.[7] The question is to what extent this increased demand is likely to be reflected in increasing demand for food imports. The region has never been self-sufficient in food and fibre. After poor crops, prices escalate rapidly and a high priority is likely to be given by governments in the region to food price stability and the establishment of food grain reserves in order to achieve this objective. Food aid and food assistance programmes will continue to be important in the poorer countries, and although foreign indebtedness is not a serious problem in this region, lack of overseas earnings is likely to be a constraint on bourgeoning demand for imported non-staple food products.

2.12.12 Overall it seems probable that the region will remain a significant importer of cereals and could become a modest but increasing importer of meat and dairy products over the period. Changing dietary patterns are likely to involve the incorporation of more animal protein in daily per capita food consumption. Price, product form and promotion are likely to play a major role in determining which livestock products will be preferred. Developments over the next 15 years will have a significant long-term impact on the likely role of milk products and red meats in the Central Asian region.

* Defined to include India, Pakistan, Bangladesh, Sri Lanka, Nepal and Bhutan.

2.13 Latin America

2.13.1 For the purposes of this study, North America has been included in the Pacific Basin region, while Central and South America have been excluded and grouped as a separate region, 'Latin America'. This, admittedly arbitrary, classification derives from a perception of historical and current relationships with the countries concerned rather than from the geography of the Pacific. With hindsight, this classification was not only arbitrary, it was perhaps also erroneous since the study is supposed to be forward-looking, and there can be no question that by 2000, Latin America will figure more prominently in New Zealand's trading and marketing strategies than is the case today, both as a potential market and as a potential competitor.

2.13.2 Latin America is a region characterised by great diversity among countries and sharp contrasts even within countries. It covers over one-quarter of the world's land area but accounts for less than one-tenth of the population. It contains almost one-quarter of the world's permanent grasslands, but only 11% of arable and permanent crop area. Its agricultural land is equivalent to 2.6 ha's per head of the population.

2.13.3 Although the region includes some 28 sovereign states, four countries, Brazil, Mexico, Argentina and Venezuela, account for 63% of the population and almost 90% of GNP (1980). The particularly rapid growth of Mexico and Venezuela was largely based on petroleum. Although the population of the region grew more rapidly during the 1970s than in the rest of the world, gross national product grew even more rapidly and in nominal terms GNP per capita rose from US$564 in 1970 to US$1,831 in 1980. In real terms, the average increase was 3.6% per annum against a world average of 2.9% although the rate was very much lower for the second half of the decade than for the first.

2.13.4 Food consumption per head is above world average with animal products figuring prominently in the diet and showing the fastest rates of increase.

2.13.5 Latin America has been a traditional exporter of primary products destined originally for Europe and North America but more recently also towards Japan. These exports include minerals, tropical products, such as coffee, sugar and fruits, grains and oilseeds and meats.

2.13.6 Over the period 1970–1980, production in the major cereals and livestock product categories increased substantially, but in each case, the region's share of world production has remained more or less constant. Imports have generally tended to increase in relation to the rest of the world, whereas exports have tended to decrease, reflecting growing demand pressure within the region.

2.13.7 A key factor in determining the future role of Latin America in agricultural product markets will be the trend in population over the next 15 years or so. FAO data and projections indicate that the annual rate of increase for the region as a whole could rise to 2.6% during the 1980s before declining to less than 2.4% during the decade 1990–2000. On the other hand, Economic Perspectives Inc.[7], using World Bank data have projected a decline to 2.3% from 1980 to 1990 and

Infogram 2–IX

Latin America

List of Countries: Low Income: Bolivia, El Salvador, Haiti, Honduras
Middle Income: Colombia, Costa Rica, Cuba, Dominican Rep., Ecuador, Falkland Is., Chile, Guatemala, Guyana, Jamaica, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Surinam, Trinidad and Tobago, Uruguay, Venezuela
Newly Industrialised: Argentina, Brazil, Mexico

Population '000	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80**	**1980/90**	**1990/2000**
Region	368,725	478,181	605,359	2.4%	2.6%	2.4%
World	4,318,610	5,158,725	6,044,984	1.9%	1.8%	1.6%
Share of World	8.5%	9.3%	10.0%	–	–	–

Gross Domestic Product $US '000 (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	439,152	762,044	1,230,511	–	5.7%	4.9%
World	7,514,930	12,076,597	20,767,207	–	4.9%	5.6%
Share of World	5.8%	6.3%	5.9%	–	–	–

Gross Domestic Product/Capita $US (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	1,218	1,556	1,988	3.6%	2.5%	2.5%
World	1,677	2,229	2,962	2.9%	2.9%	2.9%
% of World Average	73%	70%	67%	–	–	–

Land Area 1980 '000 ha's	**Total**	**Arable and Perm. Crop**	**Perm. Pasture**	**Forest**	**Agric. Land/ Capita**
Region	3,331,512	158,506	813,428	1,533,996	2.6 ha's
World	12,748,619	1,414,675	3,328,734	4,516,339	1.1 ha's
Share of World	26.1%	11.2%	24.4%	34.0%	–

(1) GNP **not** GDP

to 1.9% during the final decade of the century, giving a total population in 2000 of 544 million, instead of the 605 million projected in Infogram 2-IX. This difference could have a significant effect on the rate of economic growth, since the cost of investment to achieve a given rate of economic growth will be higher where the rate of population increase is more rapid. At the same time, the rate of increase in GDP per capita will be lower.

2.13.8 Using FAO data, we have projected a 5.7% rate of increase in GDP from 1980–1990 and a rate of 4.9% from 1990–2000, with an annual increase of

2.5% in GDP per capita over the whole period. On these figures, Latin America's share of world population will have increased to 10.5% by 2000, and its share of GDP will remain at about 6%.

2.13.9 Growth in food consumption will be largely determined by rising incomes and increasing population, but particularly in Latin America, social policies are also likely to have a major impact on patterns of income distribution and, as a consequence, on demand for food. While reliable estimates of the size of the subsistence population in Latin America are not available, it has been suggested[7] that the figure is likely to exceed 50% and is falling only slowly.

2.13.10 Overall, however, the consumption responses to income changes in the region are expected to remain high and it has been estimated[7] that because of population increases alone, the region will require 52% more foodstuffs than was consumed in 1980.

2.13.11 The following excerpts from *Global Demand for US Food and Fiber*[7] provide a useful summary of prospects for the region, in the principal agricultural sectors of interest to New Zealand.

"The economic outlook for this region depends heavily on the economic performance of the industrial nations in Europe, the United States, and Japan, and on the demand for the commodities Latin America exports, including petroleum. A key factor for the coming decade is the duration of the current depression and the measures taken to deal with it, both in raw material exporting nations, and in the industrial nations. If current account deficits diminish and currency exchange rates stabilise, trade will likely increase. If not, the key Latin American exporters will face growing economic difficulties. The third factor is the success the Latin American nations have in improving the lot of the poor—their diets, their productivity, and their incomes. Progress in these areas is crucial to the stability of each nation, and of the region. To foster such changes without disrupting the economy by inflation and budget deficits is the key challenge faced by every economy in the region.

Unlike most regions of the world, the arable land base in Latin America has the potential to be expanded significantly. Over the decade of the 1970s, the base was increased 1.1 percent per year. Because the potential for such development exists in Brazil and Mexico, and to a smaller extent in other regions, and because the incentives for such expansion can be expected to be so strong, continued investments to expand and improve agricultural land can be expected.

Land improvement and irrigation will be increasingly expensive so that increases in irrigated areas are most likely where such projects are already underway. Most of the expansion in arable area is likely to be rainfed and depend on adaptive management techniques, better fertiliser, and land clearing to bring forest or grassland into production of annual crops.

The Livestock Sector

The production of meat and other animal products varies widely by country in Latin America. Both production and consumption of animal products have been increasing rapidly as economies grow. The region's three largest nations (with about 60 percent of the population), accounted for almost 70 percent of the cattle inventory and about the same share of the poultry. Poultry inventories are growing far more rapidly than any

other, with most of the poultry increase in Brazil.

Throughout much of Latin America, meat consumption is increasing faster than production. The exception is Brazil, which increased its meat trade balance by 21 percent during the 1970s. Mexico, in particular, has become deficit in meat, as has the region as a whole. This implies increasing efforts to satisfy meat demands with animals that require a minimum of grain and oilseeds, and thus increased emphasis on poultry and pork production.

Cereals

Maize will continue to be the principal crop with more than one-third of the crop area, and the region will likely increase the area in maize in response to the demand both for food and feed. Economic incentives should be strong and persistent. Average maize yields are low, and the potential for increased income through improved practices and varieties is great. Considerable effort to improve yields and production is underway, especially in Mexico but elsewhere as well.

Projections of harvested area, yield, and production to 2000 imply major changes in cereals, with much of the change arising from increased yields. The increase in cereal area is expected to amount to 10 percent, and yields are expected to rise by 48 percent. The result is a 63 percent increase in production, to 146.3 million tonnes.

Trade Implications

Even though Argentina and Brazil can be expected to continue to be large net exporters of grains, oilseeds, and meats, the region likely will become more deficient in cereals and oilseeds.

Efforts to improve diets can be expected in most countries at the same time efforts are made to try to slow demand growth for meats and to constrain coarse grain and oilseed use. As incomes increase, the demand for meats will likely increase but will likely be directed toward pork and poultry and away from beef.

The per capita consumption of meat increased slowly during the 1970s, but even that modest 1.3 percent annual rate, together with increased food use of cereals, moved the region from a surplus of cereals to a substantial deficit in cereals. Production of both cereals and oilseeds is expected to increase rapidly during the next two decades—nearly 2.2 percent per year. However, a nearly 0.6 percent annual increase in per capita cereal consumption, plus the 2.1 percent increase in population, imply annual consumption increases in the range of 2.7 percent and continued cereal deficits.

The growth of oilseed consumption is expected to be even more rapid, nearly 1.3 percent per capita and more than 3.5 percent in total. However, since the region has a large surplus of oilseeds even at more than 1.9 percent per year, increases in oilseed production will be enough to satisfy the domestic use and continued oilseed surplus."

2.13.12 While generally endorsing this analysis of prospects in Latin America, we would be inclined to attach more weight to the historical variability in policy objectives which has been a feature of Latin America for many years. As a consequence we consider it unlikely that any clear priorities, e.g. between cereal production or livestock production, will emerge by 2000. It follows that we are not so certain either that the region will become more deficient in cereals and oil-

seeds or that it is likely to become a net importer of meat. From New Zealand's viewpoint we would tend to the view that strong demand growth will be matched by and reflected in production increases, with major export growth concentrated in the horticultural sector and in poultry-meat.

2.14 Africa

2.14.1 The African region includes the five 'Mediterranean' countries of North Africa and the 45 countries which are known collectively as 'Sub-Saharan Africa'. The continent occupies about 22% of the world's land area but contains only 13% of the arable and permanent crop area. It accommodates 11.6% of the world's population, but generates less than 3% of world GDP. Food consumption is below world average, particularly consumption of animal products, and the rate of increase during the decade 1970–1980 was significantly below the world average.

2.14.2 With the notable exception of Libya, and to a lesser extent Algeria and Tunisia in the north, and South Africa to the south, the economies of the countries in the region are small and dependent on the export of a limited range of tropical products or other primary commodities. Populations have been increasing significantly faster than in the rest of the world and more rapidly than food production within the region. Most of these people are engaged in subsistence farming which accounts for over 50% of total agricultural output.

2.14.3 It is significant that while Africa's share of world population is increasing, its share of world agricultural production, particularly in the critical areas of cereals and livestock products, is tending to decline. An increasing share of world agricultural imports, a decreasing share of exports and an increase in the agricultural share of total merchandise imports are all further evidence of the increasing pressure on supplies of food in the African region.

2.14.4 During the decade 1970–1980, economic performance varied widely. In most of the oil-producing countries*, real GNP per capita grew at around 3% per annum and this is expected to accelerate over the next two decades. For the region as a whole, however, real GNP per capita grew at only 1.5% from 1970–1980 and this is likely to increase only to 2.4%, compared to a 'world' figure of 2.9%. Most of the non-oil producing countries in the region were severely affected by the oil price increases of the 1970s, accumulating massive current account deficits and external debts and incurring crippling debt-servicing commitments. In most cases, the situation has been aggravated by poor performance in the agricultural sector, partly caused by unfavourable climatic conditions.

2.14.5 Sub-Saharan Africa is the only part of the world where food production per capita actually declined between 1970 and 1980. Aggregate production grew only slowly, outpaced by population growth and self-sufficiency in the area fell from 98% in 1960 to 87% by 1980.

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* Algeria, Angola, Cameroon, Congo, Gabon, Ivory Coast, Libya, Nigeria, Tunisia.

Infogram 2–X

Africa

List of Countries: Low Income: Angola, Benin, Burundi, Central African Rep., Chad, Egypt, Ethiopia, Gambia, Ghana, Guinea, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Riwanda, Senegal, Sierra Leone, Somalia, Sudan, Tanzania, Togo, Uganda, Upper Volta, Zaire, Zambia
Middle Income: Algeria, Cameroon, Congo, Gabon, Ivory Coast, Libya, Mauritius, Morocco, Nigeria, Tunisia, Zimbabwe (Rhodesia)
Developed Market Economies: South Africa

Population '000	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80**	**1980/90**	**1990/2000**
Region	468,459	625,068	829,268	3.2%	2.9%	2.9%
World	4,318,610	5,158,725	6,044,984	1.9%	1.8%	1.6%
Share of World	10.9%	12.1%	13.7%	–	–	–

Gross Domestic Product $US '000 (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	210,471	363,422	612,471	–	5.6%	5.4%
World	7,514,930	12,076,597	20,767,207	–	4.9%	5.6%
Share of World	2.8%	3.0%	3.0%	–	–	–

Gross Domestic Product/Capita $US (1980)	**Actual**	**Projected**		**Annual Rates of Increase**		
	1980	**1990**	**2000**	**1970/80(1)**	**1980/90**	**1990/2000**
Region	449	571	725	1.5%	2.4%	2.4%
World	1,677	2,229	2,962	2.9%	2.9%	2.9%
% of World Average	27%	26%	25%	–	–	–

Land Area 1980 '000 ha's	**Total**	**Arable and Perm. Crop**	**Perm. Pasture**	**Forest**	**Agric. Land/ Capita**
Region	2,838,423	180,301	725,109	685,500	1.9 ha's
World	12,748,619	1,414,675	3,328,734	4,516,339	1.1 ha's
Share of World	22.3%	12.8%	21.8%	15.2%	–

(1) GNP **not** GDP

2.14.6 Economic Perspectives Inc.[7] report that:

"Many of the internal problems inhibiting agricultural growth over the past twenty years are related to the policies that have been pursued. Trade and exchange policies have overprotected industry, held back agriculture, and absorbed too much administrative capacity. Too little attention has been paid to administrative constraints in mobilising and managing resources for development. A consistent bias has existed against agriculture in price, tax and exchange rate policies.

. . .Despite the intensifed efforts of many African governments, as well as many international organisations, the limited natural resources and unfavorable climate are formidable constraints to agricultural expansion in the region. Growth in food production will depend heavily on land development, irrigation and water control systems, development of improved seeds and high yielding varieties, in addition to better marketing and distribution systems."

2.14.7 In considering the future role of the African region in agricultural trade, it is necessary to distinguish between the oil-producing countries, particularly those bordering on the Mediterranean, and the non-oil-producers, mainly in the Sub-Sahara. South Africa, too, which is the largest economy in the region, and the most self-sufficient, needs to be considered separately.

2.14.8 The oil-producing countries can expect increasing incomes, increasing populations and more equitable income distribution. Food demand will increase and there will be constraints on their ability to expand domestic agricultural production sufficiently rapidly to meet the increased demand, particularly for livestock products. As a consequence, these countries are likely to show strong increases in import requirements although, as in the Middle East, these requirements are likely to change as new dietary patterns emerge and as infrastructure and distribution and storage facilities improve.

2.14.9 For the non-oil-producers, the current problems are likely to become more acute over the next two decades. Crop areas are expected to increase only slowly and at the cost of considerable investment in irrigation, farm development, infrastructural development and training schemes. The livestock sector, although relatively large, is too extensive and inefficient to become a base for a programme of rapid expansion, even if ancillary resources, and necessary feed supplies were available. The food deficit in these countries will increase, but without the resources to pay for commercial imports a considerable emergency food aid requirement can be foreseen. However, the lack of an adequate infrastructure, including distribution and storage facilities, severely limits the amount of imported food which can be effectively distributed in the areas in which the need is greatest: irrespective of whether the imports are on a commercial or on an aid basis. The overriding priority in these countries is the development of their own infrastructures and their domestic agricultural production and marketing arrangements. Under current circumstances, despite their food deficits, these countries are unlikely to become significant commercial food importers over the next two decades.

2.14.10 South Africa has a policy of self-sufficiency and is in fact an exporter of temperate agricultural and horticultural products, often in competition with New Zealand. However, the incomes of the lower-income groups are rising rapidly, food demand is still increasing and there are likely to be sporadic import requirements in major commodity areas, such as meat and dairy products, as well as market opportunities for specialty products.

Chapter 3 A Framework for Assessing Agricultural Market Prospects

3.1 Introduction

3.1.1 The basic premises on which an agricultural marketing strategy will need to be developed are presented in Chapters 1 and 2. By the year 2000, a world population of more than 6 billion will require an agricultural output some 50 to 60% greater than in 1980. Demand for food and agricultural products in developing countries will double. Import dependency will have increased. If the broad demand for food is there, why should New Zealand, as a food supplier, not prosper?

3.1.2 Put simply, we could fail to prosper if, as a food supplier, we were to fail to produce for each potential market, the right kind of good at the right price. A malnourished person, or even just a hungry one, will turn away from food if it does not conform with his accustomed dietary pattern, even if it is offered free. Certainly changing taste preferences, which reflect changing income and cultural factors, exert a strong influence on commodity demand, even in countries where demand greatly exceeds supply. But these effects can be modified by technological developments, cost efficiencies, changes in market price relativities and the introduction of new substitutes. It will be necessary therefore for New Zealand to anticipate as accurately as possible, the commodity forms and product specifications and presentations which will be required as the demand for food changes. We must decide whether, how and even where, New Zealand can produce such products at the right cost. It will no longer be sufficient to pursue a strategy in which policies are aimed at maximising production in the hope or expectation that the market will take care of itself. More and more, New Zealand's agricultural strategies will need to respond to developments in the market-place, looking for demand, price and competitive supply signals from markets abroad, allowing them to filter back through the system to the points at which marketing, processing, production, investment and individual land-use decisions are made. There is much scope for improving the channels for that information flow and the manner in which New Zealand responds managerially to the information. How should our marketing respond to trends in global supply and demand over the next 15 years? What influences or changes in priorities should be brought to bear upon our present trade patterns and marketing objectives? What consequent changes will be required in the production and processing sectors?

3.2 Methodological Considerations

3.2.1 An essential element in the development of any statement on sectoral marketing and production strategies is a capacity to monitor, to analyse and to evaluate all possible opportunities and options on a systematic and a continuous basis. This presents particular problems for New Zealand planners, exporters and producers partly because, as a small country, we lack the resources required to maintain a world-wide monitoring operation, and partly because our traditional concentration on a narrow range of markets has not equipped us with the breadth of experience required to evaluate market opportunities in new and strange marketing environments. Chapters 1 and 2 provide a framework for sys-

tematic analysis which will take us along the road towards general conclusions as to how demand is likely to evolve in different parts of the world. In order to further narrow the search for potential market opportunities, this analysis needs to be complemented by an assessment of how, at the individual commodity level, supplies are likely to develop to match evolving demand.

3.2.2 Clearly, trends in production and trade and in levels of consumption will all be influenced by inevitable changes in national policies, changes in absolute and relative prices, changes in exchange rates and changes in technology. The prediction of such changes is difficult. In fact at present New Zealand lacks the data base and the analytical capacity needed to build into the analysis a consistent set of variables to take into account on a global basis the effects of such changes, even for a limited range of food products, far less other agricultural products with an 'export' dimension. As a consequence, the next step towards the development of an agricultural strategy will be limited to a 'balance-sheet' type of country by commodity analysis, confined to livestock 'food' products, in which constant prices and constant policy assumptions are maintained. The 'crude gap' market surplus or deficit which emerges as a result of this analysis should *not* be regarded as a forecast of likely market potential (in practice, no such 'gap' can ever exist). However, it will provide a basis from which to develop a consistent set of estimates or forecasts of market potential and it will provide an objective framework for analysis, independent of particular data and hence able to accommodate new data on a continuing basis.

3.2.3 This chapter constitutes an attempt to establish such an analytical framework as a basis for the assessments of market outlook and export growth prospects for different products contained in the following chapters.

3.2.4 Although the methodological concepts underlying this approach have been employed fairly widely overseas for projects of this type, the approach has been used only once previously in New Zealand, when Ojala[5] reworked part of the FAO 'At 2000' study, in order to present the data in a New Zealand context. Although FAO is expecting to produce new supply projections to 2000 and new demand estimates based on up-dated projections of income and population during 1984, these revised data were not available while this study was being undertaken. As a consequence, and in the light of experience over the period since the original estimates were made, the projections of income and consequent demand appear to have been considerably over-stated. The projections of supply are even more suspect, since they are no more than linear extrapolations of trends observed over the decade from 1970 (1969/71) to 1980 (1979/81).

3.2.5 The reader might well ask why, in view of these limitations and shortcomings, this approach has been used at all. The answer lies in the title of this report, *Towards a Strategy for New Zealand Agriculture*. By flagging the concepts and identifying data needs and deficiencies, we hope that the relevant organisations will be encouraged to participate in the refinement and development of the methodology and the necessary data base.

In this way it should be possible to assemble and provide the framework and the basic components for strategic market planning which have been so lacking in New Zealand until now.

3.3 Time Horizons

3.3.1 An important distinction for analytical purposes is between short-term and longer-term time horizons. In the short term, the major factor determining the export prospects for a New Zealand product is the current size of other countries' import markets for the product or products concerned, particularly in relation to domestic production, and New Zealand's current percentage share of those markets. In the short term—defined here as up to five years, i.e. up to 1990—market size and market share will largely determine an exporter's prospects for growth. Although response lags differ from product to product, it is assumed, at least for livestock products, that major shifts in production patterns will not take place over the 'short term', as defined. In the longer term—defined as from five to 15 years, i.e. the period 1990 to 2000—however, an important factor is the growth prospect for the market itself. In the longer term, enough time will have elapsed for policy responses and for strategic shifts to have occurred in the underlying pattern of demand and supply that makes up a country's commodity import requirements; and also for New Zealand producers to alter their own production patterns.

3.4 Nutritional and Consumption Factors

3.4.1 Nutritional and consumption factors have been discussed in global and regional terms and in relation to different economic groups of countries in Chapter 1. The major food commodities produced in the world—cereals, meat and fish, eggs and milk, fruit and vegetables—contain different relative amounts of basic nutritional substances*. Very broadly, carbohydrates are obtained from cereals and sugars, while vitamins and minerals are present in fruits and vegetables. Proteins and fats can be derived from both animal and vegetable sources—from meat, fish, eggs and milk on the one hand, and cereals, beans, peas, lentils and nuts, on the other.

3.4.2 From a study of dietary patterns, a number of specific points can be inferred relevant to New Zealand's agricultural marketing objectives. First, the great variation among countries in the total protein intake level. As has already been shown in Chapter 1 in Infograms 1-IV, 1-V and 1-VI, there is a strong correlation between protein intake level and the level of national income. The higher protein consumers include the richer countries such as Iceland, Australia and New Zealand, USA, France and Israel, while the lowest consumers are Bangladesh and Sri Lanka, Zaire, Comoros Islands, Mozambique and the Congo. The correlation with income is not total however: the highest protein consumers in the world are the Poles and

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* See Technical Notes. Note (vii) Animal products are generally richer in protein than vegetable products but not all essential proteins are found in every food protein source. A balanced protein diet, therefore, requires a proportion of animal protein with vegetable protein—and indeed a balance within vegetable sources such as between leaf and cereal protein.

the third highest the Argentineans, while the Mongolians also consume a high level of protein. Clearly proximity to protein source, often independent of purchasing power or even of a monetary economy, will sustain a high protein intake level. Examples are subsistence cattle farming in African countries and the fishing lifestyle of Pacific Islanders. Such countries would not only have difficulty in affording European or New Zealand protein-rich food, but would also have less inherent demand for it than the structure of their economies would imply.

3.4.3. Secondly, in many countries, average per capita total protein intake is below the recommended daily level of 75 grams for moderately active young men and 55 grams for moderately active young women. Basic nutritional factors can thus be expected to drive demand for protein-rich food in these countries as income and accessibility constraints are removed. It is notable that our two major meat commodities—beef and sheepmeats—have less protein content than chicken but slightly more than pork.

3.4.4 The dependency of different countries on animal protein varies very widely. Those least dependent on animal sources include a significant number of Asian countries, notably Burma, China, India and Sri Lanka; some African countries, notably Egypt, Ethiopia, Algeria and Nigeria; and Indonesia and the two Koreas in the Western Pacific Seaboard. The range of meat dependency among countries is also wide. The fact that the Asian region includes the least meat-dependent countries in the world, India and Bhutan, as well as the country with the highest meat dependency, Mongolia, illustrates that the differences in market characteristics which New Zealand has encountered in Europe, are likely to be even greater in other regions. This is a factor to be kept in mind in formulating agricultural marketing strategies. The lowest meat consumers are principally the same Asian, African and Western Pacific Seaboard countries as above—notably Burma, India and Sri Lanka; Egypt, Ethiopia, Algeria, Morocco, Nigeria and Tanzania; and Indonesia and the two Koreas.

3.4.5 The contribution of milk to a country's protein intake is generally lower than that of meat. Among markets of potential importance to New Zealand, milk contributes a mere 1% to total protein intake in Samoa, Indonesia, the Koreas, Vietnam, China, and a number of Central African countries. It is also very low in the Philippines, Thailand, Burma and Bangladesh; in Latin America in Bolivia; in Oceania in the Solomons, Vanuatu and Tonga; and in Africa in Nigeria, Congo and Zaire.

3.4.6 The implications of these figures are of a general nature but they are clear. In many of these countries, the total protein intake is lower than standard nutritional requirements, and the meat and milk contributions to those inadequate levels are themselves low. It follows that as incomes rise, there should be increasing scope for exploiting demand, driven by nutritional factors, for meat and milk commodities, provided certain commercial and marketing imperatives are met. Clearly, however, the development of such markets must be regarded as a long-term investment, involving considerable initial investment in developing a suitable

range of products, distribution arrangements and recognition in the market, even before the market starts to gather momentum.

3.4.7 Within the broad categories of meat and milk consumption in each country, eating habits and traditions are frequently product specific, often confined to one type of meat, or one form of milk. Beef and sheepmeats account for only a limited proportion of total meat consumption in most countries. Even in countries recognised as traditional mutton and lamb eaters, the proportion of sheepmeat to total meat consumption is modest—in Britain it is 13%, Greece 18%, Iran 35%, Iraq 29%, Saudi Arabia 9%, Jordan 35%. In other countries which are major lamb and mutton markets for New Zealand, the sheepmeat proportion is very low. Canada and USA both under 1%, USSR and Romania both 6%, Japan 5%. In the populous markets of China, India and Indonesia, sheepmeat consumption is negligible; the proportion appears relatively high only because total meat consumption is itself so low. The Australia and New Zealand proportions are higher at 20% and 30% while in Mongolia, it is 32% and in Iceland, 72%.

3.4.8 For New Zealand an important strategic question is whether in the longer term we would do better to concentrate on market development efforts in traditional sheep and beef-eating countries or in countries in which increased demand for protein-foods generally can be expected.

3.4.9 In fact these are not necessarily mutually exclusive approaches since one type of market presumably requires a sophisticated presentation of a product, whereas the other is likely to be more price-conscious with less emphasis on quality and presentation. However, they do illustrate the need for conscious longer-term decisions as to priorities in market planning and development.

3.4.10 It should be noted that a sizeable proportion of meat consumed is derived not only from what must be termed traditional international meats—beef, sheepmeat, pork and poultry—but also from indigenous meat sources that do not figure prominently in world trade—buffalo, goat, horse, camel, venison, and game meat. European countries and Japan in particular, consume horsemeat; and indeed Australia and Canada together export US$20 million of horsemeat to Japan. The Caribbean and Pacific Island countries consume goatmeat. Of these 'alternative' meats, New Zealand produces for export only venison and a small amount of goatmeat. Although it has not been possible to include these products in the country/product analysis at this stage, it is clear that venison and goatmeat producers stand to benefit both from the expansion of demand for animal protein and also, potentially, from the diversification of demand in the more affluent markets. These possibilities clearly require further investigation.

3.5 Income Factors

3.5.1 It has already been noted in Chapter 1 that in general, the lower the income level, the greater is the consumption of cereals and root crops relative to that of animal products. As income increases, a tendency exists to switch from cereals and root crops to products of animal origin, especially meat and milk products. This

tendency to change the pattern of consumption expenditure as income increases, gives rise to what economists refer to as *the income elasticity of demand** for any given product. If the income elasticity of demand for a commodity is greater than 1, then there will occur a proportionate switch in expenditure towards that commodity as income increases. If it is less than 1, a proportionate switch in expenditure away from that commodity will occur as income rises, although there will still be an absolute increase in expenditure on that commodity. If the elasticity is negative (i.e. less than zero), then an increase in the individual or country's income will be followed by an actual reduction in the total amount expended on that commodity. The income elasticity of demand concept is important, because it gives us an idea of likely trends in demand in foreign markets for our food as incomes in those countries rise.

3.5.2 In recent decades, much empirical research has been undertaken in an increasing number of countries, using household surveys, to derive income elasticities of demand for different commodities and for different social and income groups within total populations. For example, the latest FAO set of income elasticities, compiled in 1978 and based on 1975 data, shows that New Zealand, which has one of the highest levels of meat consumption in the world (123 Kg per person annually), had a zero or even negative income elasticity of demand for meat. As a consequence, total per capita meat consumption is expected to fall as income rises in the future. More recent studies suggest that the USA also has a negative income elasticity of demand for meat (see paragraph 1.4.6). According to the FAO study, Western Europe, North America, and the Latin American meat exporting countries, and other high meat-eating countries, such as Mongolia, also recorded low, though still positive, coefficients.

3.5.3 In contrast, the low meat-eating countries of Asia and the Western Pacific Seaboard record the highest elasticities—Sri Lanka (whose per capita annual consumption is 2.5 Kg) at 1.4; Vietnam at 1.0; and Indonesia at 1.3. As far as their income allows them to do so, there is clearly a high disposition among the consumers of these countries to switch from staple cereals such as rice and root crops to meat. African countries generally record slightly lower elasticities for meat: Ethiopia at .9, Chad at .9, Nigeria at 1.01, and Kenya at .9. Their recorded meat consumption is generally higher than Asian countries, and indeed their non-recorded consumption (the output of subsistence farming is often not accurately accounted for in household surveys), is probably higher again. This might explain their lesser tendency to eat more meat.

3.5.4 Of the large Asian markets that are of export interest to New Zealand through sheer population size, China records .7, India (whose consumption level of 1.5 Kg is the lowest in the world) 1.1, and Japan .8. Of the high growth, oil-rich countries of similar interest to us, Saudi Arabia records .8, and Iran and Iraq .9 each.

* Percentage increase in demand per head associated with 1% increase in income per head.

3.5.5 Similar information is available, and trade inferences can similarly be made pertaining to each country, with respect to over 60 other food groups; and indeed specific commodities such as beef and veal, or sheepmeats. It is evident, for example, that in New Zealand's three largest *lamb and mutton markets*, the elasticity of demand for sheepmeats consumption in 1982 was low at .2 in the United Kingdom, slightly higher at .3 in the USSR, and considerably higher at .9 in Iran. In our two largest *beef and veal markets*, the United States and Canada, the potential for further growth in consumption does not appear to be high, with elasticity coefficients of .4 and .5 respectively. These elasticities, moreover, are expected to decrease as incomes rise further: in the United States for example, the elasticity of demand coefficient for beef and veal was projected by FAO to fall from .38 in 1990 to .34 by the year 2000*.

3.6 Demand and Supply Projections

3.6.1 It is difficult to derive a set of realistic and consistent demand estimates. However, mainly because of the vagaries of the weather and government policies, and the influence of technological developments, it is even more difficult to produce supply forecasts which are global in coverage, realistic and internally consistent. The most recent FAO supply projections extend only to 1985 (based on the period 1972–74). However a new series is now being prepared and is expected to become available within the next 12 months. In the meantime, as a 'first approximation', we have used a simple linear extrapolation of domestic supply for each commodity based on the most recent production year available (1981) and the average annual growth rate for the past decade (1970–80).

3.6.2 *The 'Crude Gap' Concept*

Despite its shortcomings, including its constant price and policy assumptions, such a series of country/commodity supply and demand projections provides an analytical framework that is of considerable use in developing agricultural marketing strategies. The difference between projected demand and projected supply of a commodity in any one year has been designated the *'projected crude gap'*, a positive figure representing import demand and a negative figure representing export surplus. While the resultant surpluses and deficits cannot be regarded as forecasts of import requirements or export availabilities, the trend in the projected crude gap between any two selected years (such as 1985 and 2000), is of considerable importance: it enables us to compare one country with another for each commodity and assess where, in the absence of price or policy changes, significant changes in import demand or in export availabilities might be expected to emerge over the next 15 years. This is an important step towards the prediction of import requirements or export availabilities.

3.6.3 It is important to recognise the real use, and limitations, of an exercise of this nature. Projections are often criticised

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* As noted in paragraph 3.5.2, some more recent studies suggest that the income elasticity of demand for meat is now zero or even negative in the U.S.A.

from a misperception of their intended function. They are not employed for the purpose of predicting precisely what will occur at a specified point in the future. Their job is to highlight the factors inherent in existing trends by extrapolating these trends into the future. They allow us to appreciate what, on the basis of current factors*, will happen in the future, other things being equal—that is, if no new factors or altered relationships emerge. This is palpably unrealistic, and it is a deceptively logical step to conclude that they are therefore of no value. But the projections serve a heuristic purpose in the defining of a strategy or a set of policies: they compel consideration of certain trends and relationships and indeed of countries that may not otherwise become apparent from a mass of unanalysed data. Such projections prompt us to identify and focus on selected points of interest and investigate these further. That is their main function. They may not illuminate the road ahead, but by enabling us to order and perceive relationships, they form the best thin torchlight into the future we have to hand at present.

3.6.4 On the basis of the foregoing considerations, we have constructed a framework which is intended to help to identify important developments in supply and demand for agricultural products likely to have a significant bearing on New Zealand's future agricultural marketing prospects. This has been done, on a commodity/country basis, along the following lines:

1. Nutritional and consumption market characteristics of each country:
   - (a) Nutritional
     - (i) Total average daily protein intake
     - (ii) Contribution of animal protein to total intake
     - (iii) Contribution of meat and milk sources to total intake
   - (b) Consumption
     - (iv) Breakdown of meat consumption, by animal category
     - (v) Breakdown of milk consumption, by product category

2. Market trends for selected commodities and countries:
   - (a) Short-term market trends
     - (vi) Import dependency
     - (vii) Import market size
     - (viii) New Zealand's market share of that import market
     - (ix) Major suppliers in competition with New Zealand
   - (b) Longer-term market trends
     - (x) Projected growth in aggregate demand
     - (xi) Projected growth in domestic supply
     - (xii) Projected growth in crude gap, expressed in metric tons
     - (xiii) Projected growth in crude gap, expressed per 100 MT net global growth.

3.7 Product Coverage

3.7.1 Because of time and resource constraints, the analysis has been limited to New Zealand's five largest food export

* The simplifying assumptions are explained more fully in the Technical Notes.

commodities—beef and veal, sheepmeats, whole milk, butter and cheese*. Information on the above, categorised for six commodities and 158 countries, together with explanatory methodological notes, is set out in detail in working documents and more detailed tables held in the Planning Council. It is hoped that eventually the analysis, which for the reasons already outlined, should be regarded at this stage as being illustrative of the approach, can be refined and extended to include other products. Subsequent chapters present the results of the analysis of market trends for some selected commodities.

* To varying degrees other products are covered.

Chapter 4 The Market Outlook and Export Growth Prospects for Beef and Sheepmeats

Beef and Veal

4.1 Characteristics of the International Beef and Veal Market

4.1.1 The international beef market can be broken up into two distinct sectors; trade between countries which are free of foot and mouth disease, and trade between those in which foot and mouth disease is regarded as being endemic. As a result, there are also generally two separate pricing regimes, the first being dominated by North America and Japan as importers and Australia and New Zealand as exporters. The other 'market' is dominated by the European Community and South American countries as exporters to a number of markets which include the USSR and the Middle East. Within each of these market sectors, the trade can be broken down further into its 'prime' and its 'manufacturing' segments. In the foot and mouth free sector, the major part of the trade to North America is boneless manufacturing beef for use in hamburgers, sausages and other processed meats. Exports to Japan, South Korea and to a wide range of smaller markets have been essentially of prime beef cuts.

4.1.2 The international beef trade is subject to considerable political interference. Most of the major importers now have tariffs, quotas and other protective measures in place designed to protect their own domestic industries. The systems operated by Japan and the EEC, are designed to raise the price of imported product to the domestic price level through the imposition of variable levies. The quota systems operated by the United States and Canada are aimed at regulating total supply, but without the implementation of rigidly administered pricing mechanisms. Japan reinforces its variable levy system with quota controls. Within these systems, there are a number of variations in the way in which trade operates. These range from private sector commercial transactions, to government-controlled trade systems and, in some cases, government agencies negotiating directly with individual exporters.

4.1.3 Although its share of the world's 1981 beef trade was modest at 6.8%, New Zealand is the world's fourth largest exporter and beef was, at NZ$619 million, its third largest export commodity, accounting for 9% of total trade. The US beef market is our largest single country /commodity market, comprising, in 1982, two-thirds of total export earnings from beef, and providing 6% of total export income. In dollar terms, New Zealand's current major beef markets are USA (NZ$417m), Canada (NZ$62m), Japan (NZ$20m), Hong Kong and Singapore (NZ$14m each), and Britain (NZ$12m).

4.1.4 New Zealand beef is currently sent overseas either as chilled cuts, frozen beef quarters, frozen beef cuts or as manufacturing beef. The frozen beef cuts are consumed in foreign markets as prime beef. For the year ended September 1982, 37% of our beef went in this form as frozen prime beef, 60% went as frozen manufacturing beef for the hamburger trade, and 3% as chilled beef. Infogram 4-I shows the breakdown in New Zealand's export trade to our major 1982 markets between prime beef and manufacturing beef.

Infogram 4-I

Form of Beef Exports: Major Markets Year Ended September 1982

Country	Tonnage (000MT)	Frozen Cuts	Manufact-uring	Chilled
USA	162	32%	68%	
Canada	21	48%	52%	
Japan	3	65%	35%	
Hong Kong	2	89%	11%	
Singapore	2	90%	10%	
World	214	37%	60%	(3%)

4.2 Short-Term 'Crude Gap' Analysis—Beef and Veal

4.2.1 Infogram 4-II indicates a number of countries for which an analysis of import market size, import dependency, and current New Zealand market share, suggests a possiblity of market expansion. The two Western Pacific Seaboard countries, Japan and South Korea, are quite large markets, moderately import dependent, and New Zealand's market share is quite low. As a consequence, consideration of a strategy for these markets would appear to warrant a high priority from both a market development and a trade policy point of view. The Japanese imports are predominantly of prime beef—New Zealand exports go mainly to Okinawa where the US presence has had an influence on eating habits. The Korean preference has been for bone-in-beef for which our production systems are no longer so well adapted and we have accordingly lost out to the Australians, who have established a competitive edge in this market. However, since 1983 Korea has included a greater proportion of boneless beef in its tenders and New Zealand has obtained a significant share of this element in the tenders. In the Middle East, the possibility of expanding our share of the (single-buyer) Iranian market (currently at 9%), is worth considering. Similarly, the Saudi market for prime halal beef appears to have potential for expansion beyond our current 16% share, against Australian and Indian competition. In Latin America, Brazil and Chile offer possibilities but these would involve competing against well-established Uruguayan and Argentinean suppliers. The relative proximity of Chile probably offers us better prospects in this regard. New Zealand shares of the Canadian and US markets (42% and 28% respectively—mainly manufacturing beef), are already substantial, and the voluntary restraint arrangements governing imports to these two markets (Australia has 37% and 47% respectively), inhibit expansion of exports to North America*. The four large EEC markets of Britain, France, West Germany and Italy, are virtually closed to third countries†, apart from the 'balance

* New Zealand's 'historical' share of the US market based on 1980 and 1981 market shares when entry was unrestricted, was 25.65%, against an Australian share of 52.25%.

† Except for certain developing countries which receive preferences under the terms of the Lome agreement.

sheet' arrangement each year, under which the Community permits the importation of certain quantities of manufacturing-type beef cuts. Hitherto, such imports have been mainly from Argentina. In the four North African countries, Libya, Tunisia, Algeria and Morocco, markets are small but significant and increasing. However, these markets are currently shared amongst the EEC, Australia and Argentina, and the chances of New Zealand obtaining a significant toehold, particularly against competition from heavily subsidised sales of EEC intervention stocks, appear to be slight. The Egyptian import market is large and New Zealand's market share is very low, European and Latin American suppliers sharing 82% of the market. However, prices and transport costs would not be in New Zealand's favour. In summary, it seems clear that the prospects for rapid market diversification and expansion in the short term are fairly limited, unless product range and market positioning can be radically altered.

4.3 Longer-Term 'Crude Gap' Analysis—Beef and Veal

4.3.1 Infogram 4-II also indicates prospective longer-term growth markets for beef. Although, for the reasons given in Chapter 3, longer-term demand prospects have probably been overstated, there should still be considerable growth in net global demand for beef over the next 15 years. At constant prices, the demand projection exceeds the supply projection by 7.4 million tonnes in 1985, and by 9.7 million tonnes by 2000. That is to say, the growth in global demand over the period 1985–2000 is projected to exceed the growth in global supply by an

Infogram 4–II

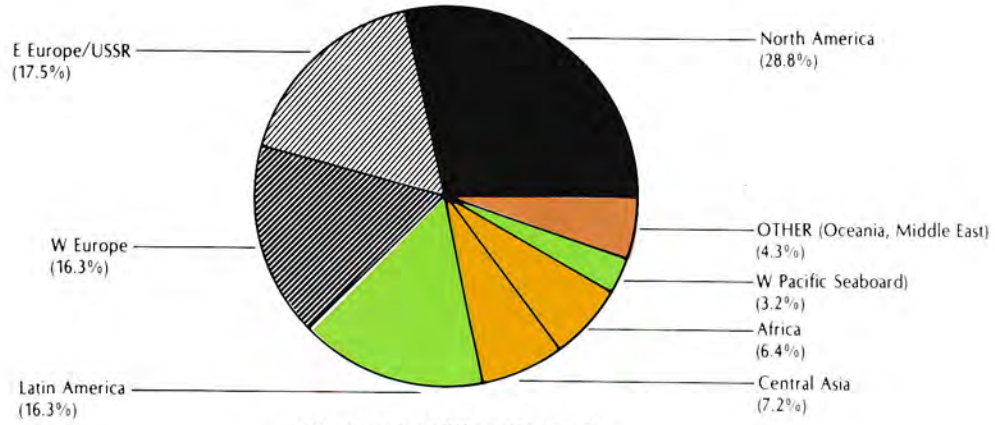
CRUDE GAP ANALYSIS—BEEF AND VEAL

(A) SHORT-TERM (1985–1989) MAJOR COUNTRY SHARES

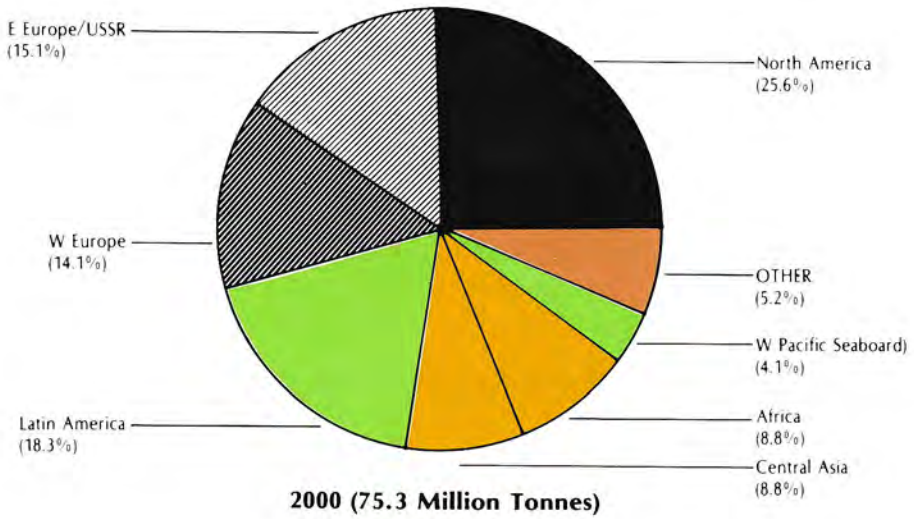
Import Dependency	*Country*	*(000MT)*	*Import Dependency*	*Country*	*(000MT)*
21%	Japan	122	19%	UK	135
25%	R. of Korea	29	13%	France	237
20%	Iran	41	13%	FRC	175
77%	S. Arabia	64	25%	Italy	366
6%	Chile	13	46%	Egypt	109
3%	Brazil	60	33%	Libya	16
5%	Canada	53	27%	Tunisia	10
5%	USA	544	34%	Algeria	17

Infogram 4–II—Crude Gap Analysis—Beef and Veal—*continued*

(B) SHARES OF PROJECTED NET GLOBAL DEMAND

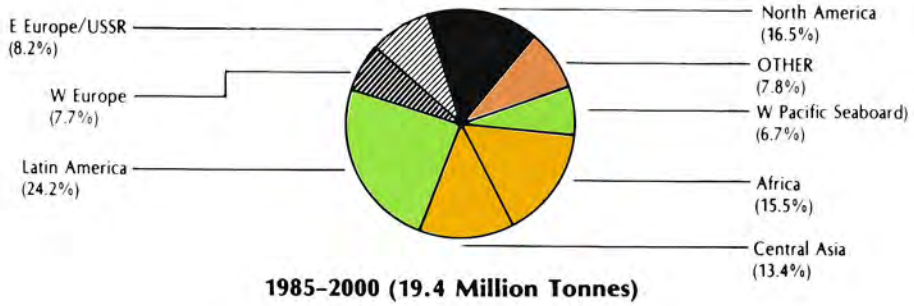


1985 (55.9 Million Tonnes)



2000 (75.3 Million Tonnes)

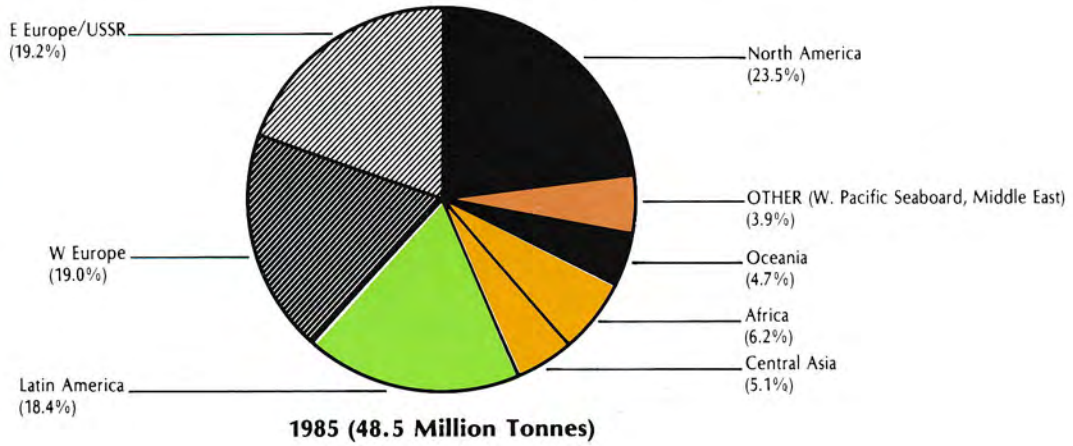
SHARES OF PROJECTED GROWTH OF DEMAND



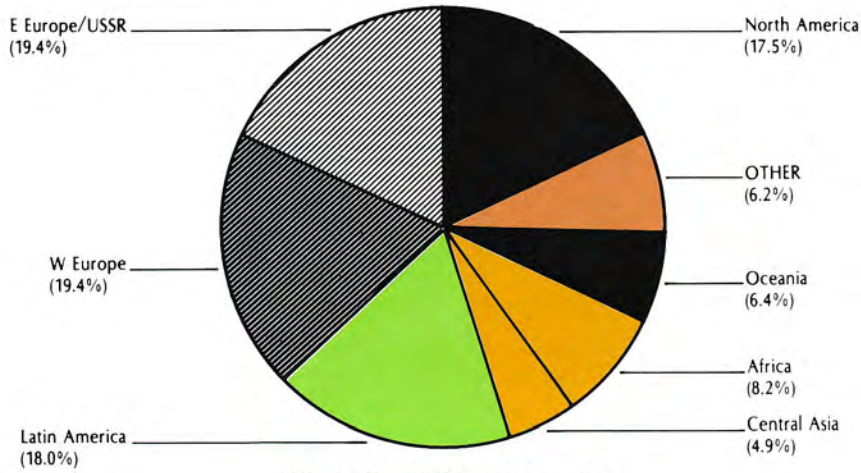
1985–2000 (19.4 Million Tonnes)

Infogram 4-II—Crude Gap Analysis—Beef and Veal—*continued*

(C) SHARES OF PROJECTED NET GLOBAL SUPPLY

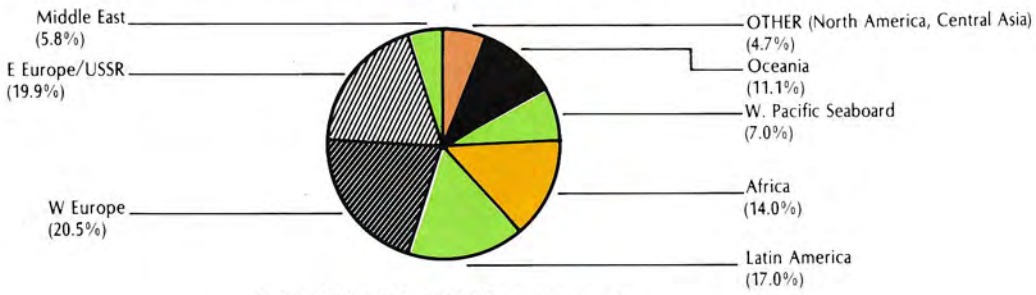


1985 (48.5 Million Tonnes)



2000 (65.6 Million Tonnes)

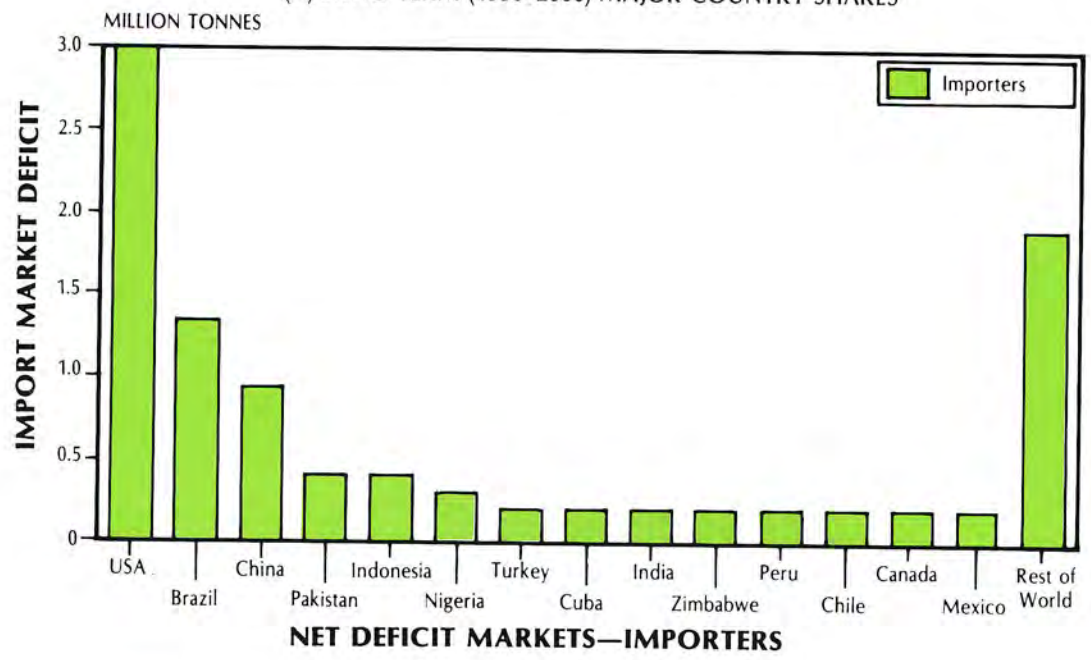
SHARES OF PROJECTED GROWTH OF NET GLOBAL SUPPLY

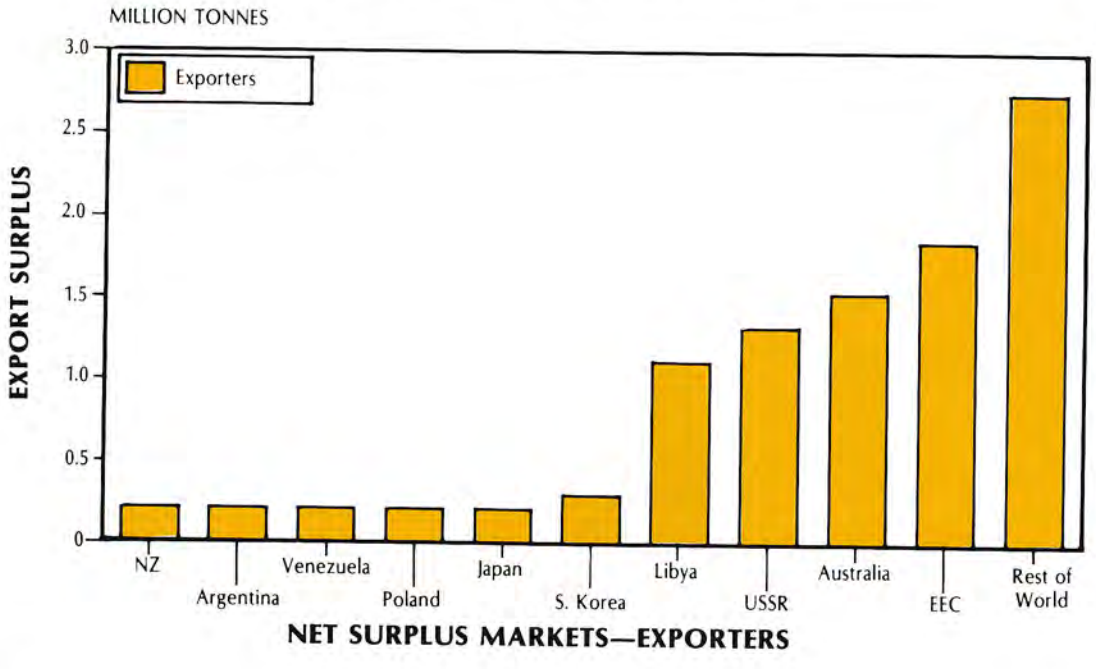


1985–2000 (17.1 Million Tonnes)

Infogram 4-II—Crude Gap Analysis—Beef and Veal—*continued*

(D) LONG-TERM (1990-2000) MAJOR COUNTRY SHARES





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average annual net increase of 156,000 tonnes. Even after making an allowance for over-optimistic income growth predictions, the constant price and policy assumptions and the probability of significant variations in actual future trends, these figures provide some grounds for optimism concerning the longer-term future of the New Zealand beef industry.

4.3.2 The infogram identifies what are ostensibly the 14 major projected longer-term growth markets. Of these, the more established markets of USA and Canada, and the more proximate markets of China, Indonesia, Chile, Peru and Mexico, and perhaps India, Pakistan and Zimbabwe, appear to warrant particular attention. Also identified are the 12 countries which, on recent trends, seem likely to become the major exporters. After the EEC, the largest potential growth competitor would appear to be Australia; reinforcing the interest to New Zealand under CER in coordinating export marketing strategies. Although a surplus is projected for the Soviet Union, in practice this country is most unlikely to become a significant meat exporter. Should the USSR become self-sufficient in meat production (itself an unlikely event), the main effect would be a reduction in the importation of cereals and foodstuffs. Two Latin American countries, Argentina and Venezuela, also appear likely to emerge as more significant exporters. Although the analysis suggests that both Japan and South Korea could become major exporters, these results highlight the caution with which the approach needs to be used. Even at this stage, the results indicate the need for more up-to-date, and in some cases, more refined, information to be fed into the original analytical framework. Meanwhile, longer-term trends in Japan, in particular, hold significant implications for our valuable prime beef trade and certainly warrant more detailed analysis.

4.3.3 *Japan*

Japan has given a high priority to food security and has sought to achieve this objective by developing a domestic livestock system. In practice, however, this has merely shifted external dependence from final products (e.g. beef), to intermediate products (e.g. animal feeds). The Japanese have sought to offset increasing external dependence in the feeding stuffs sector by buying into the grain and soya supply systems in North America, and by investing in the development of other sources of animal feeds, e.g. soy bean production in Brazil and grain-maize production in South East Asia.

4.3.4 Japan has placed quota restrictions as well as high tariffs on imported products to bring the price of imports up to the domestic price level. This has provided protection for domestic producers against competition from outside, with the level of protection being tailored to the prices determined as an appropriate return for producers. A challenge for New Zealand, at the political level, will be to convince the Japanese that they could achieve both economic benefits and increased food security by increasing the share of final product obtained from New Zealand. At the present time, the main pressures on the Japanese are coming from the USA and, as a consequence, any liberalisation of the Japanese quota system for beef can be expected to benefit mainly American beef suppliers. The Japanese government has advised that it

intends to reduce beef prices to consumers and to relax beef quotas in 1984. A further consideration is the contribution of the dairy industry to beef production. In Japan, as in many other countries, the evolution of beef production is likely to be affected very significantly by policies and trends in the dairy sector.

4.3.5 *South Korea*

South Korea is another country with limited ability to increase production. While support levels are not as extreme as in Japan, South Korea is characterised by the same dependence on imported feeds. At the present time, beef imports are restricted by government controls which allow imports only through the NLCF*. This means that South Korea is, in effect, a single buyer market. Future developments are very dependent upon policy directions to be decided in the near future and the Korean government has recently been examining the experience of other countries, and particularly Japan.

4.3.6 *EEC*

The EEC is another market where actual future production growth is likely to be below the projected trend line as a result of a reduction in the support and protection measures which have boosted production in recent years. The EEC beef industry is dominated by the dairy sector and the support this sector has received has resulted in expensive surplus production of both beef and dairy products. Stocks have built up to record levels and are only able to be exported with the help of substantial export restitutions (subsidies). Financial and political factors are likely to lead to less generous levels of support in the future and production increases will consequently be slower than in the past. Nevertheless, the EEC spent NZ$1,800 million supporting its beef and veal sector in 1983 and currently EEC beef exports to North America are subsidised by NZ$1,160 per tonne. It has been suggested recently[32] that the EEC could have an annual exportable surplus of 500,000 to 1 million tonnes, unless there are drastic changes of policy.

4.3.7 *Brazil*

The prospect of Brazil becoming a net importer seems somewhat remote. Brazil has become increasingly important as an exporter in recent years and has a very large growth potential for beef production. While its current economic problems are likely to inhibit investment and therefore the rate of growth, they are likely to have an even more significant effect on demand and in particular, on beef imports. Brazil is a good example of a country where the crude gap analysis yields a result which cannot be regarded as a prediction of actual outcomes. Nevertheless the result is an excellent indicator of the need for closer New Zealand attention to trends in production, consumption and policies.

4.3.8 *North America*

The results of the 'crude gap' analysis in respect of the North American markets also need qualification. Recent studies discussed in Chapters 1 and 2 suggest that the FAO income elasticities have become

* NLCF is the Korean National Livestock Cooperation Federation.

outmoded, and therefore suspect, in relation to demand for red meats in high-income countries. Moreover, production during the 1970s, on which the supply projection is based, fluctuated strongly and somewhat erratically, in response to the oil shocks and the associated fluctuations in feed prices. This is another region for which it will be necessary to put more up-to-date information into the analysis before attempting estimates of future market prospects. In both Canada and the USA, import levels are governed by the provisions of Meat Import Laws which have been enacted in both countries to limit the market share open to imports (see paragraph 4.2.1).

4.3.9 *Product Types*

The analysis of longer-term growth prospects points *inter alia* towards a growing import demand for a protein-rich, inexpensive beef product for mass consumption. There are several reasons for this. First, prime beef is generally a high-priced, luxury item confined to high-income consumers, mainly in developed countries, and the hotel-restaurant sector in developing countries. The 14 prospective longer-term growth markets are mainly populous developing countries, together comprising over half the world's population. The demand here will not be predominantly for prime beef. Even in the two developed countries where some growth is possible—Canada and the USA—New Zealand beef is already channelled into the food manufacturing outlets for hamburgers and patties. There will continue to be a demand for prime beef in some of our markets—Singapore and Hong Kong, and in Japan and North America, where our animal health status gives us an advantage over South American competitors.

4.3.10 It would appear that future prospects for New Zealand beef exports lie in *two different directions*. New Zealand's markets for prime beef in traditional markets and in the high-income segments of new markets (e.g. the hotel and restaurant trade in NIC's and MIC's) require diversification and development in order to meet increasing competition for market shares. At the same time the marketing emphasis for inexpensive manufacturing beef needs to be shifted from the stagnant, traditional markets of USA or Canada (where volume growth is inhibited by basic demographic, income and taste factors, as well as by policy constraints on expansion of market share), to the more populous countries where, as indicated in Chapters 1 and 2, demand for animal protein is likely to increase rapidly. The immediate need is to research the product forms likely to be required, and then to devise processing and transportation systems which will enable us to meet product specification requirements and price objectives.

4.4 Conclusion

4.4.1 Overall, even after making allowance for slower rates of growth, it would appear that net global demand should be strong enough to provide increasing export opportunities for the relatively small volumes of increased production likely to become available from New Zealand. Despite the shortcomings of the crude gap analysis, Infogram 4-II indicates clearly how insignificant New Zealand production increases are likely to be in the context of total world production and

trade volumes. New Zealand is favourably placed, as a foot and mouth disease free supplier of both prime and manufacturing beef, to exploit emerging opportunities, provided that these can be identified and developed, and provided that production and processing structures are efficient and competitive. The need is to identify more precisely the markets New Zealand is best placed to penetrate, and the product forms required. These are the specific strategic marketing challenges confronting producers and exporters.

Sheepmeats

4.5 Characteristics of the International Market for Sheepmeats

4.5.1 The international sheepmeat trade can be separated into two distinct sectors, trade in meat derived from animals under one year of age (lamb), and trade in meat derived from adult sheep, primarily those culled from the breeding flock (mutton). The products derived from these two categories of sheepmeat are generally used for quite different purposes; mutton being primarily, but not exclusively, employed as a manufacturing meat, while lamb is a table meat. Although a much higher proportion of world sheepmeat production is traded (15%) compared with other meats (8%), sheepmeat represents a small proportion of the international meat trade. This does however point to a possible market opportunity, particularly for lamb, as a high value alternative, offering certain markets a variety from other types of meat.

4.5.2 The international trade in both lamb and mutton is dominated by relatively few countries, by far the largest being New Zealand and Australia. Also because of the relatively limited nature of the sheepmeat industry in many countries of the world, protectionist measures and other impediments to trade have been less prevalent than for beef. However in 1980 the largest importer of sheepmeat, the EEC, introduced a common market regime for sheepmeats reflecting (and protecting) the interests of the relatively large sheep industries in Britain and France.

4.5.3 The rapid emergence and growth of new import markets in the Middle East in the wake of increased oil revenues, coupled with the decline of the large UK market, has resulted in a dramatic change in the pattern of international trade in lamb during the last ten years. The mutton market has also changed considerably over the same period, as the dominance of Japan has declined while Russia, and to a lesser extent the Middle East, has become more prominent. The decline in the Japanese market has resulted from competition for pork for the manufacture of ham-type products because of low prices for pork and changes in consumer preferences as incomes have increased. In the USSR, which now dominates the mutton market, the predominant use of mutton is believed to be as a table meat rather than as a manufacturing meat. Elsewhere, mutton must compete with other manufacturing meats (including pork, beef and poultry), and the depressed world prices for these commodities have been reflected in weaker demand and poor returns for mutton.

4.5.4 New Zealand dominates world trade in sheepmeats, particularly the lamb trade. It accounted for 53% of world

sheepmeat exports, 60% greater than the combined exports of the three next largest suppliers—Australia, the United Kingdom and Mongolia. Lamb is New Zealand's second largest export commodity, accounting for 11% of total export earnings. The British lamb market, although declining, still accounts for about 40% of total lamb exports and 6% of New Zealand's total export income. In New Zealand dollar terms, the major export markets for New Zealand lamb in 1982 were Britain ($389m), Iran ($77m), Japan ($36m), Iraq ($28m), USA ($24m), and Canada ($20m). The major mutton markets were USSR ($71m), Japan ($35m) and Britain ($22m).

4.5.5 The vast differences in the character of our trade with different countries is evident from Infogram 4-III. Although meat can be exported in a fresh, chilled, frozen or canned form, most New Zealand sheepmeat is exported frozen. As a result of technological developments, there are increasing opportunities to increase the proportion exported chilled or fresh. The infogram also provides some superficial evidence of the underlying differences in distribution systems as well as in the eating habits of different peoples. Both factors are reflected in the market specification for our lamb. Until 20 years ago, New Zealand required a knowledge of these characteristics in relation to only one market, the British market, but now a similar depth of knowledge is required in relation to a host of different countries, representing a diverse range of economic, ethnic, cultural and political structures, of which New Zealand has no accumulation of experience. To date, there has not been much evidence of increases in market research budgets and activities to enable

Infogram 4-III

Form of New Zealand Sheepmeat Exports: Major Markets Year Ended September 1982

Country	Tonnage (000MT)	Frozen Carcasses	Frozen Boneless	Frozen Cuts
(i) Lamb				
U.K.	192	94%	1%	5%
Iran	52	100%	—	—
Japan	14	36%	8%	55%
Greece	10	98%		2%
USA	7	2%	2%	96%
Canada	7	4%	4%	92%
Saudi Arabia	6	96%		4%
Iraq	5	100%	—	—
Algeria	3	100%	—	—
World other 38	334	83%	1%	16%
(ii) Mutton				
USSR	63	100%	—	—
Japan	19	88%	10%	2%
U.K.	13	58%	11%	30%
World other 13	108	89%	7%	3%

the New Zealand export meat industry to remedy this deficiency in basic market information.

4.5.6 The two consumer-oriented North American markets, and to a lesser extent the Japanese market, are currently demanding retail portion controlled lamb cuts that do not require much preparation before cooking. The Americans and Canadians want simply to purchase from the supermarket an attractively presented lamb cut that can go straight into the oven and then onto the dinner table. Even at wholesale levels, customers are prepared to pay a premium price for such a product, the essential feature being convenience of cooking and serving. The Japanese, in contrast, want whole carcasses at the wholesale level, apparently for preparing traditional dishes such as sukiyaki, or for use in luncheon sausage[12].

4.5.7 The more traditional lamb-consuming countries, such as Britain and Greece, have historically imported whole carcasses for distribution to the wholesale trade. Consumers in the United Kingdom exercise a preference as to the type of cut they want—leg, loin, quarter for roasting etc., and a more personal relationship between customer and retail butcher is evident. The British consume lamb in the way that is familiar to New Zealanders. In Greece, lamb consumption is divided equally between western style roasts, and eastern style shishkebab. The Greek distribution system is reminiscent of the British Smithfield market in its heyday, when imported product was either traded direct to the local butcher retailer in whole carcass form, or to middlemen who processed carcasses into primal or even retail cuts before on-selling to the retail or catering trade. The important thing to recognise is that in both the British and Greek markets, rapid changes are taking place, both in consumer requirements and in the distribution system. The basic question for New Zealand is not whether we should be supplying consumer cuts, primal cuts or carcasses. The question is how best to organise and process New Zealand supplies of lamb so as to meet, at least cost, the evolving British or Greek demand for sheepmeats at the level of the consumer or end user.

4.5.8 In the other major markets in the Middle East and North Africa—Iran, Iraq, Saudi Arabia and Algeria—the demand is for whole carcasses, so that the traditional Moslem manner of eating lamb can be followed. Western style retail lamb cuts are not accepted and many markets, or potential markets, have had a limited capacity to store or distribute food in a frozen form. In the Middle East, methods of eating lamb have remained unchanged for 3000 years down to the present day. Lamb consumption is broadly of three types. The Bedouin lamb, known as 'Manset', is fresh lamb eaten within 24 hours of local slaughter. The whole carcass is baked in an oven with nuts and yoghurt as complements and the meat eaten by hand. It is a high priced item, fetching US$7,000-$8,000 per tonne—purchased only by wealthy families. Secondly, fresh chilled lamb of smaller size and poorer quality is flown in from Hungary, Bulgaria and Western Australia. These carcasses are hung in local butcher shops and strips of lamb of perhaps 2 Kg are cut for shishkebab with rice. It is a medium-priced product—about US$5,000 per tonne—and eaten by less wealthy families. Thirdly, cheaper New Zealand

frozen lamb carcasses are shipped in at about US$2,000 per tonne and are distributed, *inter alia*, to the armed forces of Iran, Iraq and Jordan.

4.5.9 Traditionally, mutton has been traded as a bulk-commodity, either in carcass or in boneless form. The largest import market, the Soviet Union, takes 100% of its requirements in carcass form. Soviet citizens do not appear to consume mutton as a staple dinner item of a kind familiar to New Zealanders: rather it is used as a mutton base for 'borscht' soup and subsequently eaten as boiled meat with potatoes. Mutton exports to Japan have been traditionally in carcass form to be boned out in the country of destination for manufacturing into processed meat products. However, an increasing amount is now sent in boneless form. Small amounts of mutton are being ground for fabrication into reformed chops and some is thinly sliced for use in traditional dishes. Over half of mutton exports to the United Kingdom are in carcass form, the remainder going as frozen cuts for the institutional trade or as boneless mutton for the manufacturing trade.

4.6 Short-Term 'Crude Gap' Analysis—Sheepmeats

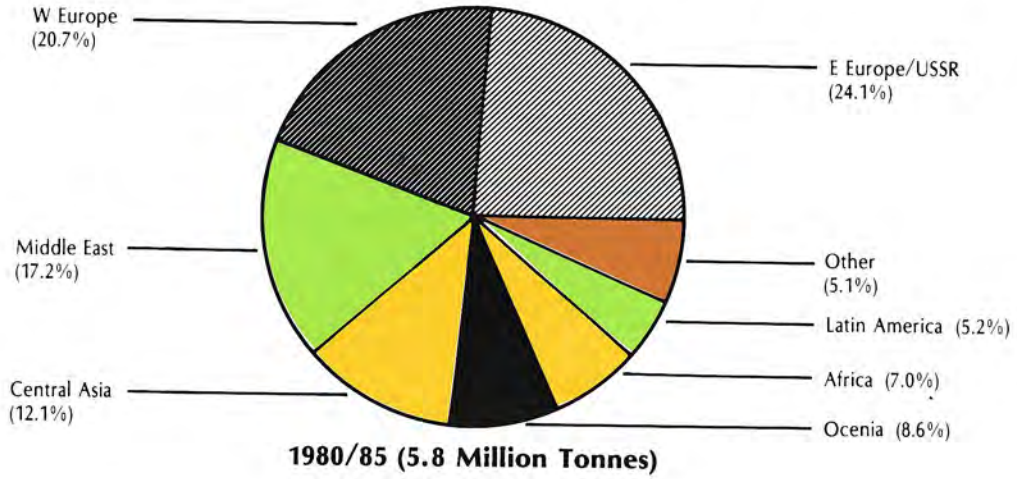
4.6.1 In general, the analysis summarised in Infogram 4-IV suggests that the best prospects in the short term lie in the established markets which have already evidenced strong growth over recent years. Most of these markets are in the Middle East region and they are markets which have been developed as lamb, rather than mutton, markets. Poorer economic performance over recent years is likely to delay or dampen the expansion foreseen in certain African and Asian markets which should be considered as longer-term, rather than short-term, prospects and perhaps as mutton, rather than lamb, markets. South Africa appears in this list as something of a wild card, requiring more specific investigation before any conclusions can be drawn.

4.6.2 Although Oceania and the Western Pacific Seaboard emerge as regions which, if Australia and Japan are excluded, can expect strong growth in import demand (6.3% per annum), the individual markets are too small to win places on the list of major prospective markets. Nevertheless, because of their dynamic character and their proximity to New Zealand, they must be regarded as important prospective markets for both lamb and mutton in the short and longer terms. The complex Australian situation is discussed in paragraph 4.7.2. The Japanese market is also a rather special case, partly because the overall trend disguises the fact that while reasonable growth in demand for lamb can be expected, demand for mutton, which is used as a manufacturing meat, will at best stagnate. However, a further factor will be the anticipated decline towards the end of the decade in Australian exports of lamb, and possibly of mutton, which should allow New Zealand progressively to take up a larger share of Japanese imports.

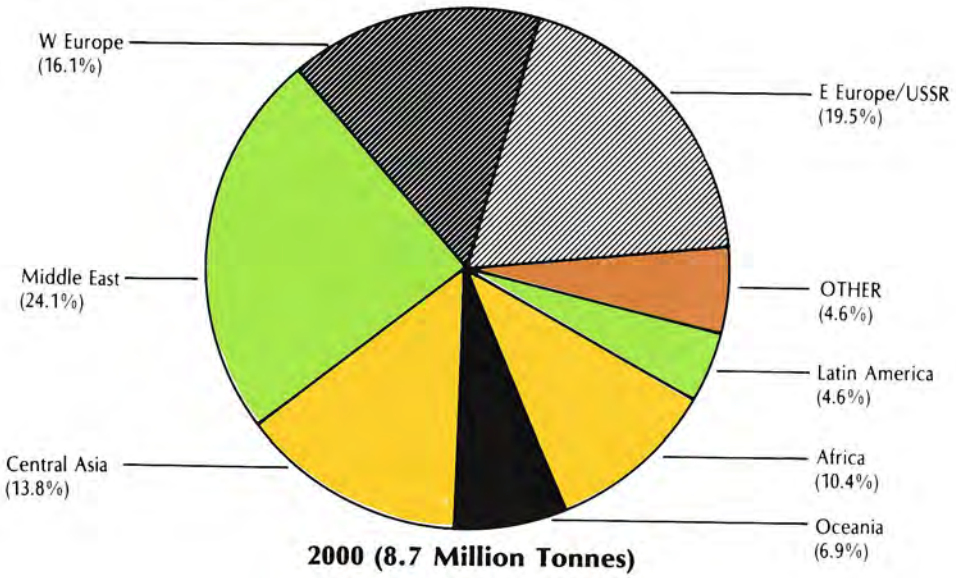
4.6.3 It is a moot point as to whether increasing production within the EEC will lead to increased exports or to the increased displacement of imports. Because of the level of support and the expectation that domestic prices will generally be above international prices, it

Infogram 4–IV **CRUDE GAP ANALYSIS—SHEEPMEATS**

(A) SHARES OF PROJECTED NET GLOBAL DEMAND

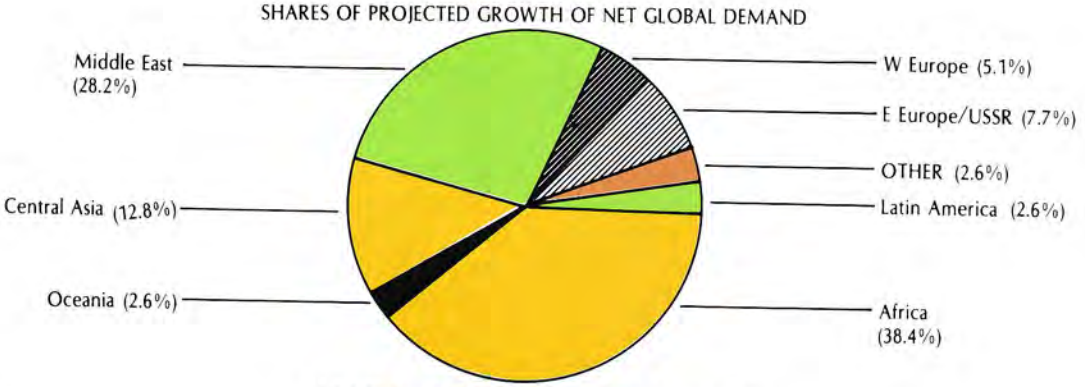


1980/85 (5.8 Million Tonnes)



2000 (8.7 Million Tonnes)

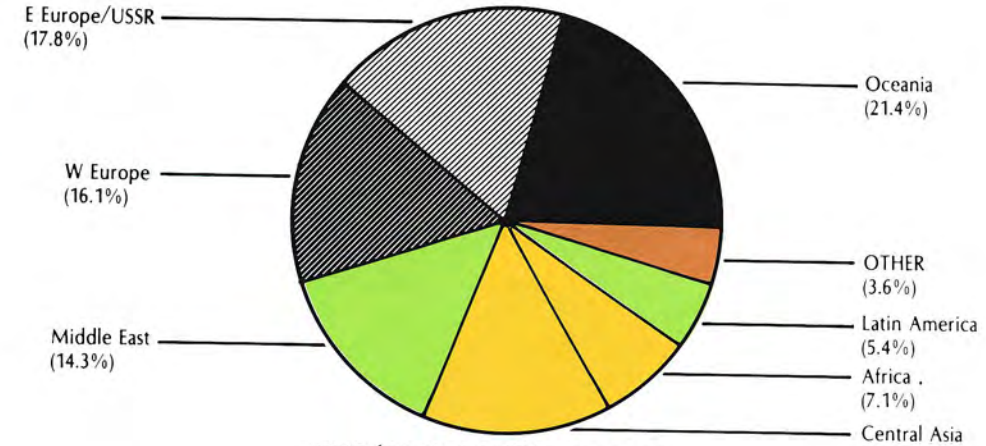
SHARES OF PROJECTED GROWTH OF NET GLOBAL DEMAND



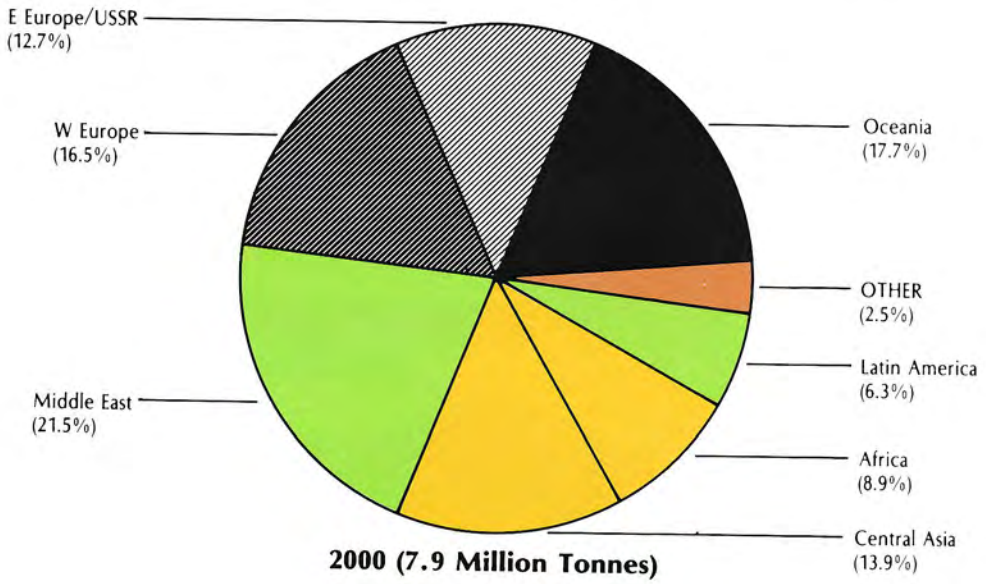
1980/85—2000 (3.9 Million Tonnes)

Infogram 4–IV—Crude Gap Analysis—Sheepmeats—*continued*

(B) SHARES OF PROJECTED NET GLOBAL SUPPLY

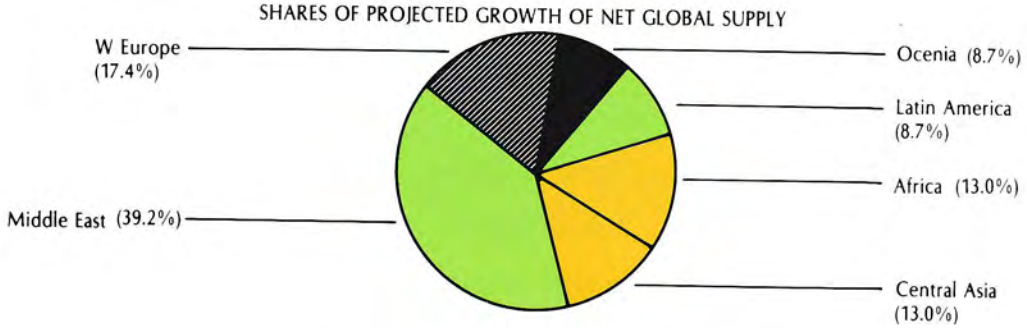


1980/85 (5.6 Million Tonnes)



2000 (7.9 Million Tonnes)

SHARES OF PROJECTED GROWTH OF NET GLOBAL SUPPLY



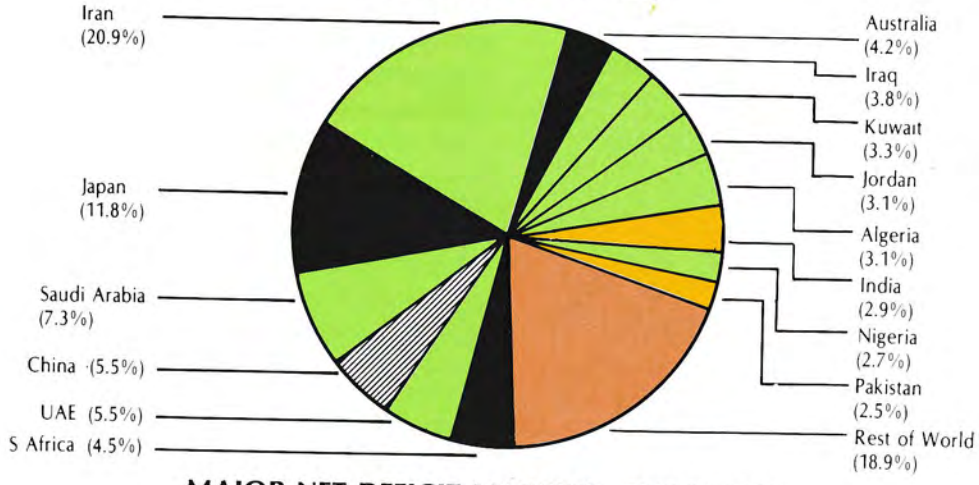
1985–2000 (2.3 Million Tonnes)

Infogram 4-IV—Crude Gap Analysis—Sheepmeats—*continued*

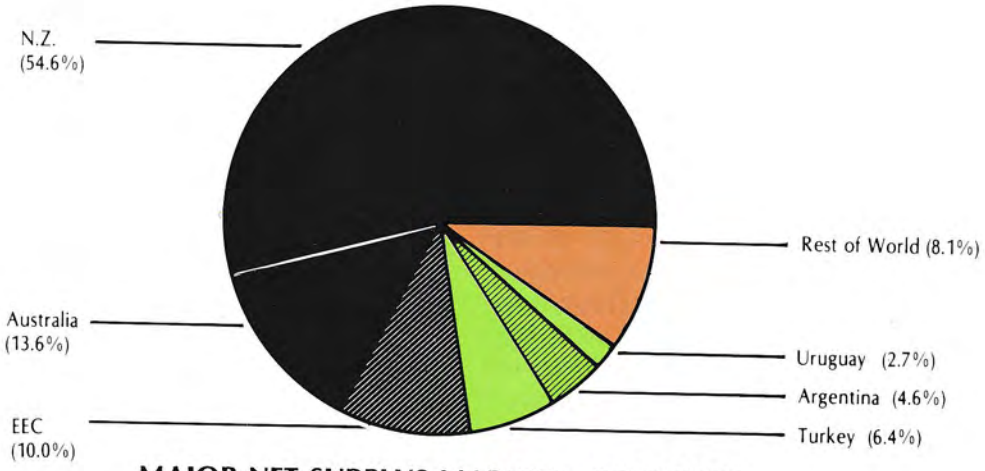
Infogram 4–IV—Crude Gap Analysis—Sheepmeats—*continued*

(D) LONG-TERM (2000) MAJOR COUNTRY SHARES

(1.1 MILLION TONNES)



MAJOR NET DEFICIT MARKETS—IMPORTERS



MAJOR NET SURPLUS MARKETS—EXPORTERS

is postulated that EEC sheepmeat exports will decline, as will imports from third countries. Although Turkey will be emerging as an alternative competitor, New Zealand's relative position in the Central Middle East and North African markets should strengthen.

4.6.4 Eastern Europe and the USSR are significant deficit areas and therefore must be regarded as major potential markets, particularly for mutton. However, because of their unpredictable pattern of purchases and general orientation towards 'bargain-basement' purchases of agricultural commodities, they have been regard as 'residual' markets and as such excluded from this analysis.

4.7 Longer-Term 'Crude Gap' Analysis—Sheepmeats

4.7.1 While flagging demand can be expected in the traditional major industrialised sheepmeat-eating countries, strong growth can be expected in a number of 'newly industrialised' and 'middle-income' countries as a result of rising income, better distribution of income, and increasing population, particularly in those countries in which a basic level of sheepmeat consumption per capita has already been attained. Although lower than predicted rates of economic growth will have some effect on demand for sheepmeat, the level of consumption in these countries will be perhaps even more strongly influenced by the availability of supplies. Domestic production will not increase as rapidly as demand, and, in the absence of policy moves, competition for imported supplies will result in relative price increases which could facilitate further market penetration by white meat producers. It will therefore be necessary to select carefully those markets on which to concentrate a development strategy, taking into account the desirability of developing some markets as mutton markets rather than as lamb markets. Examples might be the potential markets in Oceania and in parts of Africa, to complement the 'residual' markets in Eastern Europe and USSR.

4.7.2 The Australian situation requires some clarification, particularly since the availability or non-availability of export supplies from this country is of crucial significance in a longer-term strategic planning context. The projections pointing towards a contraction of export availability and a steadily increasing import requirement from the mid 1990s, are based on a period during which the Australian industry was subject to a rather unusual combination of climatic and economic conditions which is unlikely to be repeated. On the other hand, the situation in which the increase in demand will outstrip the rate of increase in domestic supplies seems likely to continue throughout the period under review. At this stage, we would venture the tentative view that Australia will remain an exporter of mutton (and live sheep), though in diminishing quantities, but is likely to have an increasing import requirement for lamb. Because of the importance of Australia as a competitor and potential competitor, particularly in the Western Pacific Seaboard and Middle East markets, this conclusion needs more detailed consideration.

4.7.3 It must be emphasised that while the 'crude gap' or 'net demand' indicated by these projections is a useful signpost,

indicating where to look for potential export markets or potential competitors, these concepts do not of themselves indicate the real import or export potential of the country concerned. An assessment of actual import market potential, and New Zealand prospects, must take into account possible movements in prices and price relativities and likely changes in national policies in the countries concerned, as well as a more detailed study of the structure and the characteristics of the market itself.

4.7.4 The shifts in demand for sheepmeats have important implications for the future marketing of mutton and lamb. Clearly there will be a need to present sheepmeats in a product form and at a price which respond to specific consumer requirements and preferences in each market. The existing pattern of lamb and mutton exports is highlighted in Infogram 4-III. In 1982, 83% of our lamb was exported in frozen carcass form and only 16% was sent in retail form as frozen cuts. An even higher proportion of our mutton was sent as frozen carcasses. However, there is little to be gained from a debate which commences with an argument concerning the degree of further processing to which agricultural products should be subjected before being exported from New Zealand. The key question in developing a market strategy, not only for sheepmeats, but also for all other products, is, "What product will the consumer be wanting in three or five years' time—in terms of taste, size, presentation, packaging, etc.?" Once that has been established, it becomes meaningful to discuss where and how that end-product should be produced—in New Zealand, in the country of destination, or at some intermediate location in order to ensure the best combination of quality and competitiveness in the market. The conclusion reached may well involve a substantial increase in New Zealand's financial and commercial involvement in off-shore processing facilities, following the example of the dairy industry.

4.7.5 Although the EEC market is likely to diminish in size, it will remain an attractive, high-priced and increasingly sophisticated market for high quality products. Although the EEC has recently been importing some mutton, it is considered that given existing trends in the market, in the context of a 'quota' arrangement and a high price situation, it will, or should, revert to being almost exclusively a market for high quality, high-priced products. The increasing importance of quality and price, rather than volume, as elements in a longer-term strategy for this market, needs to be given greater consideration when considering New Zealand's stance in relation to any future re-negotiation of access arrangements.

4.7.6 In the North American markets, prospects depend almost exclusively on the competitiveness of our retail cuts, particularly against white meats. Moreover, frozen cuts of New Zealand lamb are competing against fresh American lamb. Efforts to increase sales, and more particularly to introduce chilled lamb cuts rather than frozen cuts, have triggered a vociferous reaction from the minute, indigenous sheep industry. It is of some concern that to date, the 'bark' of the American sheepmen appears to have had more effect on the New Zealand authorities controlling exports, than on the coyotes which are decimating their flocks.

The prospects of increasing New Zealand's market share and net export return from lamb sales in North America in the short term do not appear high, unless New Zealand is prepared to market chilled lamb and to market its products more aggressively.

4.7.7 In Iran, the market for sheepmeat and the level of import dependency are increasing rapidly. This market is probably unique in that New Zealand's share of the market for lamb will depend to a large extent on how far it wishes to become dependent on one market, particularly a market in a region not renowned for its political or economic stability. In the longer term, there could well be a case for substituting mutton for some of the present supplies of lamb, if other export markets can be found for lamb. If the quality of the cheaper mutton product is comparable with that of product supplied by other suppliers, such as Eastern Europe and Australia, there could be considerable scope for increasing our market share in what is already a sizeable market. There may also be potential for satisfying part of the demand for cheaper low-grade sheepmeats through the supply of canned mutton, rather than through the carcass trade.

4.7.8 Although a 'residual' market, the Soviet Union must still be regarded as offering the best longer-term prospects as a volume market for mutton, probably still in the form of frozen carcasses. However, price will be a major consideration in this market.

4.8 Conclusion

4.8.1 The probability that the growth in import demand for sheepmeats over the next 15 years will be concentrated mainly in the populous middle-income and developing countries, poses important strategic marketing and trade policy questions for New Zealand. From a marketing point of view, priorities need to be established based on what are expected to be the characteristics of the various markets in five or ten years' time. Product and market development programmes need to be initiated having first clearly established the target segments of the market being sought, and decisions need to be taken as to whether the further processing involvement should be undertaken in New Zealand, in the destination market, or at some intermediate point. Since the price competitiveness of the final retail product will be all important, neither these questions nor their institutional environment should be prejudged. These issues should be determined in each case on the criterion of the best rate of return to the exporter. This will be largely dependent on the cost-effectiveness of New Zealand processing and transportation systems.

4.8.2 For some markets, there may be scope for developing a cheap, mass-produced, protein-rich meat loaf for bulk distribution. Another possibility would be incorporating other complementary food items with canned mutton, as a whole food package, for offer *inter alia* to national armed forces and other institutional buyers in Asia, the Middle East and North Africa. In some cases, where longer-term prospects have been identified, but where no commercial market currently exists, it may be desirable to link initial supplies to bilateral aid programmes which can be phased out as the market develops. Overall, if New Zealand does not accurately

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assess and meet emerging demand, it risks losing out in the new and sizeable markets as well as facing a no-growth situation in more established markets.

4.9 Competition from White Meats*

4.9.1 The shares of world consumption enjoyed by different meats have shifted over recent times, with the greatest increases occurring in poultrymeat and pigmeat. In all regions, the growth of poultry consumption has been outstanding and has displaced traditional leading meats in some countries. New Zealand, as a major supplier of sheepmeat and beef, has a vital interest in countering the competition from white meats.

4.9.2 In many markets, lamb is a high-priced meat relative to white meats. Even in the UK, lamb prices have been undercut by those of white meats for more than 20 years. Thus the price advantage of white meats is now firmly established in developed countries, at around 30–50% of the retail price of beef. White meats, especially pork, also provide a low-priced raw material for further processing, and have eroded the position of mutton as a manufacturing meat in Europe and Japan.

4.9.3 Red meat and white meat production systems have different efficiencies in converting feed to meat, reinforced by technological advances in feed mixes and animal breeding. In the USA, the broiler industry can produce a 1.8 Kg bird in seven weeks, using 2 Kg feed for every 1 Kg of meat produced. For beef, 8–9 Kg feed is required for every 1 Kg of meat. Consequently, each broiler breeder hen produces on average 200 Kg retail weight of meat per year, in comparison with 147 Kg on average from beef cattle. Furthermore, the degree of wastage in the marketing chain is higher for red meats than for white. In the pork industry, the past 20 years have seen the average weight of market hogs in the USA increase by 3%, while the pork yield per hog rose by 31% due to breeding advances.

4.9.4 While the major impacts of technical progress in white meat production may already have been felt in the developed world, the application of available technologies in white meat production in developing countries still shows scope for further gains. Already, commercial poultry production in some of these countries (e.g. Brazil) has reached productivity levels approaching those in developed countries. Also, introduction of new technologies can produce a considerable improvement in efficiency of feed use over traditional systems (e.g. Thailand).

4.9.5 The fall in price and rise in both production and consumption of white meats in recent times has largely been due to these technological developments. While white meats have been more amenable to technological improvements than red meats, that is not to say that such improvement is impossible within beef and sheepmeat production. The pressure is firmly on the red meat industry to design and adopt new technologies to

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* This section is based on Clough, P.W.J. and Ojala, E.M., *Competition Among Meats—The Place of New Zealand Lamb*, (ref No. 17).

help maintain their competitiveness. No less important are the recent and current efforts in New Zealand to reduce processing and marketing costs through technological developments in processing and industry re-organisation.

4.9.6 Since white meats gain their price advantage from productivity gains that are not likely to be matched by red meats, then red meat marketing must focus on the differentiation of the product on its qualitative characteristics. Successful promotion of such qualities is vital to create a presence and image for red meats in the face of competition from white meats. Considerable market research and product development are likely to be required so that the qualitative characteristics so promoted are also those demanded by the market (segments) at which the promotion is directed.

Chapter 5

5.1 Introduc

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* See Appendix

Chapter 5 The Market Outlook and Export Growth Prospects for Milk and Milk Products

5.1 Introduction

5.1.1 In New Zealand, just over 2 million dairy cows in milk produced 7.1 million tonnes of milk in the year ended May 1983. About 9% in total was used on farms or went to liquid milk and cream consumption in New Zealand. The remaining 91% was utilised in manufacture, of which about 90% (or 80% total milk production), was available for export. The decision on the mix of manufactured dairy products was determined largely by the export market opportunities open to that production*.

5.1.2 For the year ended June 1983, milk and milk products, including casein products, returned to New Zealand $1,563.7 million, 21.5% of our total merchandise exports, the major commodity returns being:

Infogram 5-I

Major New Zealand Dairy Exports 1982–1983

	$ million
Butter	556.1
Skim-milk Powder	257.7
Cheese	236.4
Wholemilk Powder	215.5
Casein	193.6

Other dairy products exported included anhydrous milk fat and ghee, whey and whey protein products, evaporated and condensed milks and ice-cream.

5.1.3 An assessment of export market prospects for milk and milk products is difficult because of the complex technology involved in milk processing and the range of alternative products for which milk can be used in response even to short-term market forces. There are also severe difficulties in drawing comparisons among milk products and commodities because of the interlocking end uses to which each commodity can be put, the different amounts of whole milk each is derived from, and the lack of comparable data on which to base assessments among products. Nonetheless, a broad view can be gained of demand patterns for milk as a whole and for certain specific products that are of trade importance. In the context of total world milk production, New Zealand ranks as a small producer—accounting for about 1.5%. About 471 million tonnes of milk were produced globally in 1981, nearly half a litre per day for every man, woman and child. Dairy cattle supply the vast bulk of the world's milk (91%), but buffalo milk has increased in recent decades (to 6%) at the expense of goat and sheep milk.

5.2 Characteristics of the International Markets

5.2.1 Total international trade in dairy products is very small, representing only about 5% of total world milk production. Most dairy industries are domestically oriented and with few exceptions, notably New Zealand, regard the international dairy trade only as a means (albeit often costly) of disposing of surplus production. The major dairy producing/consuming areas in the Northern Hemisphere are heavily protected against imports and it is necessary to exclude trade within these areas and economic blocs, e.g. the EEC,

* See Appendix III, "The Nutritional Componentry of Milk and Product Options Available to the Market".

when assessing the size and pattern of international trade in order to identify the markets open to New Zealand's dairy exports. FAO trade data are inadequate for making this distinction and it has been necessary to widen the data source to supplement and moderate the results obtained using FAO data.

5.2.2 While world demand totals around 460 to 470 million tonnes of milk per annum, international trade accounts for only about 25 million tonnes of milk, or approximately 5% of total consumption. Of this quantity, trade occurring under strictly limited access conditions or by fixed quotas, amounts to approximately 10 million tonnes in milk equivalence. Thus trade which is open to international competition is reduced to around 15 million tonnes of milk equivalence annually.

5.2.3 Total international dairy trade over the last decade has fluctuated between 20 and 30 million tonnes in milk equivalence. But export prices of dairy products have fluctuated even more as the very limited markets have come under pressure from periodic efforts to export increased surpluses generated in one or more of the major producing countries. Over the last 30 years or so, a cyclical pattern can be detected as first the USA in the late 1950s, then the EEC in the '60s and '70s, and presently the USA and EEC together, have generated surpluses that have overhung the international market and depressed prices. In between these periods, the surpluses have been cleared by a variety of internal and external mechanisms. The trends in the total international dairy trade in milk equivalence over the last 12 years are depicted in Infogram 5-II.

5.2.4 As can be seen from the graph, New Zealand's participation in international trade has remained relatively stable, with an overall growth trend of around 1% per annum, while the market share of the EEC has fluctuated considerably. The European Community has benefited from increased demand over the last decade, and as demand has contracted over the last year or so, the Community's exports have also reduced. In other words, the EEC would appear to have either borne the brunt, or been the beneficiary, of the overall fluctuations. However, when the supply side of the picture is examined, it is apparent that the contraction and expansion of exports have resulted primarily from changes in supply within the EEC.

5.3 Factors Affecting the Product Mix

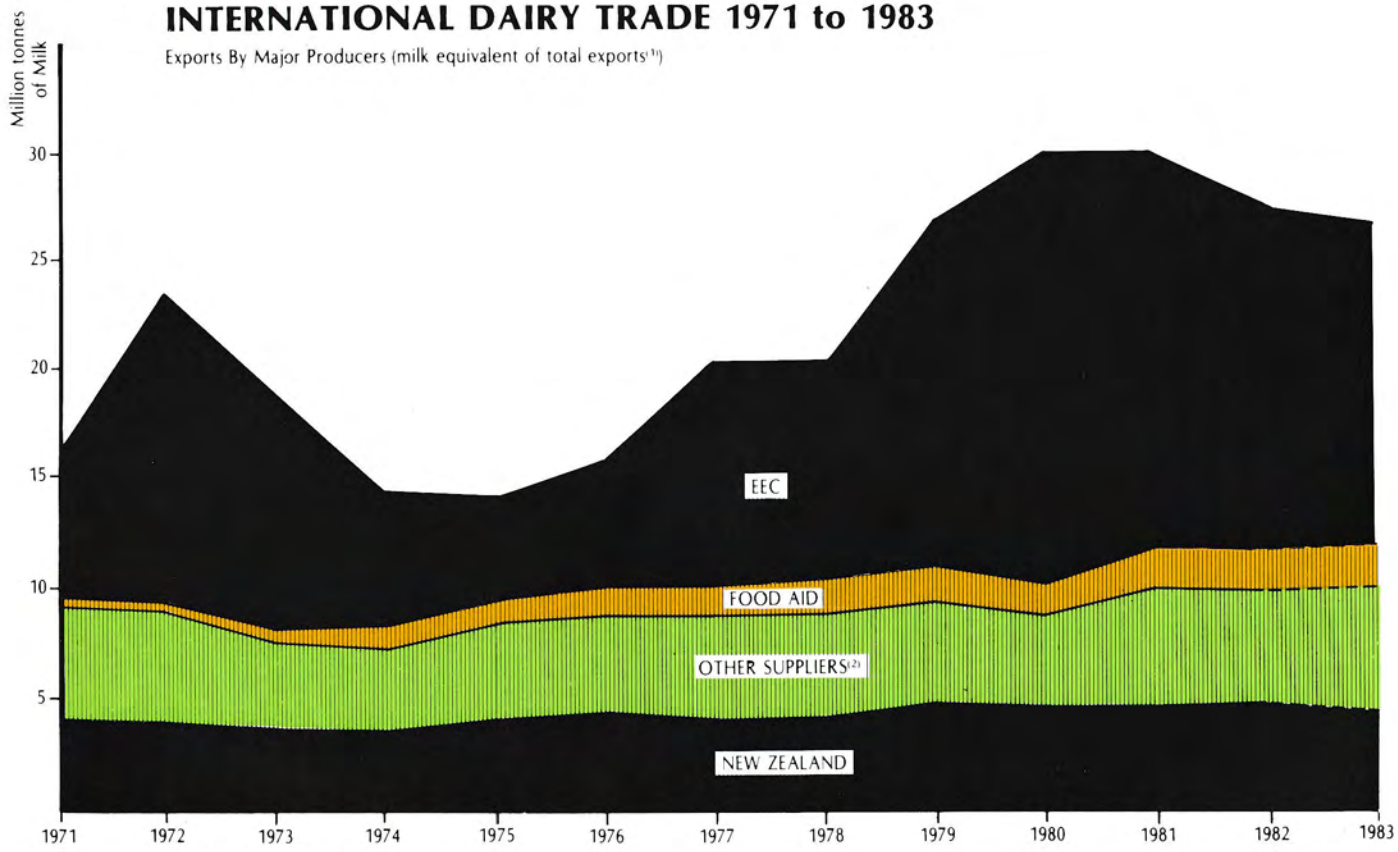
5.3.1 Whole milk can be processed into a wide range of alternative products at the option of the milk manufacturer and marketer, starting with the main items of butter, cheese and milk powder, but continuing with an increasing variety of products such as casein and caseinates, whey products, yoghurt and ice-cream and a modern range of milk proteinate products used at the food manufacturing level. Given the processing options, each industry will determine the optimal mix of commodities in accordance with such factors as available demand, technology, etc. A deficit country, whose domestic supply of milk is less than its demand for milk and all milk products, will normally allocate its own milk supply to satisfy local fresh milk consumption in the first instance. Secondary priority will be given to dairy product manufacture for domestic consumption. Imports into the coun-

Infogram 5–II
INTERNATIONAL DAIRY TRADE 1971 to 1983
Exports By Major Producers (milk equivalent of total exports[1])

Infogram 5–II

INTERNATIONAL DAIRY TRADE 1971 to 1983

Exports By Major Producers (milk equivalent of total exports[1])



(1) Fat Equivalent Basis
(2) Australia, Canada, USA, Switzerland, Austria, Sweden, Norway, Finland

Source: New Zealand Dairy Board 1984.

try to fill the 'milk gap' will generally be in milk powders and milk fat, or in non-dairy alternatives such as vegetable oil for recombining, but can also be in butter and cheese. A surplus country, having already met its domestic dairy product demand, will choose a product form for its milk exports reflecting current international demand, available processing and storage capacity, and the relative costs of manufacture and transport. In general then, it can be assumed that in the allocation of milk, the first priority will be to meet fresh milk demand and the remainder will be directed to milk products such as butter, cheese and milk powders.

5.3.2 Decisions over the product mix involve a host of factors such as short and longer-term security and opportunity; price relativities and price trends in response to changes in demand; changes in protectionist barriers overseas in response to foreign supplies; and production, processing and transport cost factors at home. In New Zealand's case, the product mix varies from one year to another and can be altered at short notice. Such flexibility may not exist in other countries. To complicate the picture, some milk products can be converted back to original or different form.

5.3.3 To understand the international milk market, it is important to recognise the role which food aid plays. Although the United States is recorded in the statistics as taking part in international trade, its contribution is mainly aid or concessional sales which can disrupt the true commercial market by suppressing or distorting real demand. Approximately 8% of all EEC dairy exports are for food aid purposes, and the East European countries also occasionally resort to food aid disposal of milk. In addition to food aid on a bilateral basis, multilateral aid agencies, such as the World Food Programme, utilise donations of dairy products. The major recipients of food aid from all sources are India, Nigeria, North African countries and now China. In developing a marketing strategy for milk and milk products, therefore, it is necessary to distinguish in the overall international transfer of milk between the real commercial market which offers definite opportunity for New Zealand, and the food aid 'market' which does not. This is not to deny a broader national interest in New Zealand food aid to various countries arising from humanitarian and political considerations. Indeed, food aid can be an important element in a longer-term marketing strategy based on the development of product 'acceptability' before incomes rise sufficiently to generate real commercial demand. However this is very different from the erratic and unplanned disposal of surpluses, under the guise of food aid, which exacerbates rather than satisfies humanitarian needs and which frequently spills over into established commercial markets.

5.3.4 Because of these complexities, and uncertainties over the future product mix required by the world's milk market, it is especially difficult to analyse market prospects for milk products as separate commodities. It is possible, from the data available, to calculate supply and demand projections for all milk and milk products expressed on a whole milk equivalence basis and to some extent for individual milk products, such as butter and cheese. However, such projections, particularly on the supply side, are not very reliable as a basis for forecasting how much milk in

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1990 will be processed into butter or cheese —or any other product—from the amount of milk available. It is therefore postulated as a general rule that after the demand for liquid consumption is met, milk will be manufactured into perishable consumer products, including cheese and perhaps wholemilk powder in proportion to expected demand; and the remainder will be turned into more storable products such as butter and skim-milk powder. This approach offers a useful framework for analysis and more detailed discussion, but does not permit precise predictions or forecasts for specific commodities.

5.3.5 Thus, projections of a more general (but more reliable) nature can be used as a basis for developing forecasts of future supply and demand for milk in general and for drawing certain inferences. In this approach whole milk is taken as the starting point and supply and demand for whole milk in total (i.e. inclusive of butter, cheese and all other milk products including fresh liquid whole milk) are projected as aggregates. It is thus possible to identify which countries are likely to trend towards a milk surplus or a milk deficit in the long term. This 'trend' information is a useful starting point for a discussion of what product form milk deficits (imports) or surpluses (exports/stocks) might take.

5.3.6 The shortcomings of the data used for this study have already been explained and in particular the probability that demand is overstated. Moreover, the fact that the supply projection assumes constant policies means the results need to be treated with considerable caution when being used as a basis for projecting or forecasting likely import demand. Nevertheless, the 'crude gap' analysis provides a basis for consideration of short-term market expansion possibilities for milk products and long-term market growth opportunities for milk and milk products.

5.4 Market Trends

5.4.1 A marketing strategy for milk and milk products must respond to market prospects which differ significantly from those for meat. Whereas the longer-term projections for beef and sheepmeats discussed in Chapter 4 show a strong net demand situation emerging, the outlook for milk is one of continuing oversupply and pressure on international markets through the next 15 years to the end of this century.

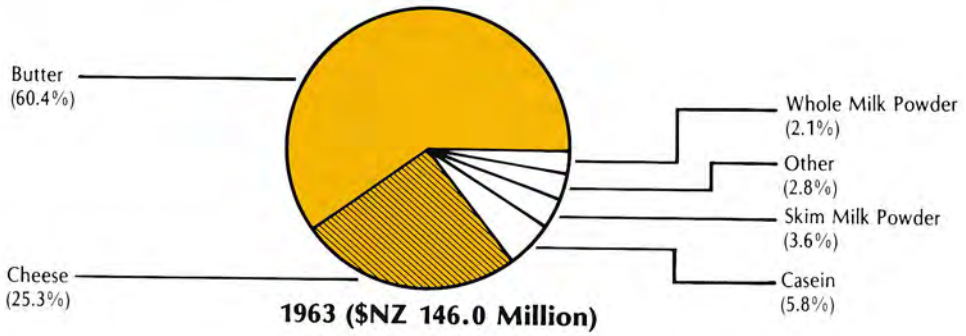
5.4.2 The marketing strategy for milk products must take as its starting point the expectation of this much more difficult trading environment, pressure on our established markets and intense—and what may well appear to be unreasonable—competition for new markets. Production, processing and marketing decisions—the quantity of milk to produce, the product choice, the target country and customer demand to satisfy—will become even more critical for the dairy industry. Attention must be directed towards maximising net returns per litre of milk produced, particularly when under pressure from surplus production and excessive stocks.

Appendix III, "The Nutritional Componentry of Milk and Product Options Available to the Market" shows the increasing sophistication of milk technology and marketing reflected in the trends in foreign sales of New Zealand

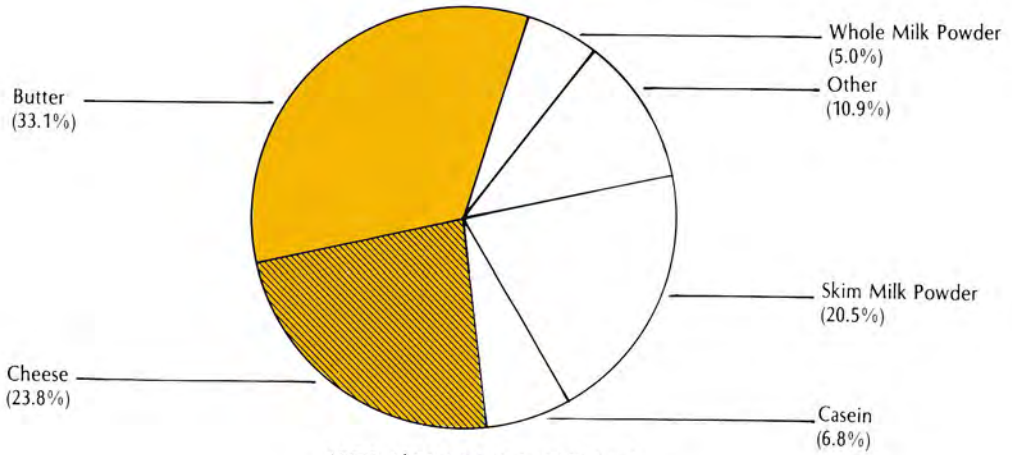
Infogram 5–III

THE DIVERSIFICATION OF N.Z. DAIRY EXPORTS

(CONTRIBUTION TO TOTAL DAIRY EXPORT EARNINGS)



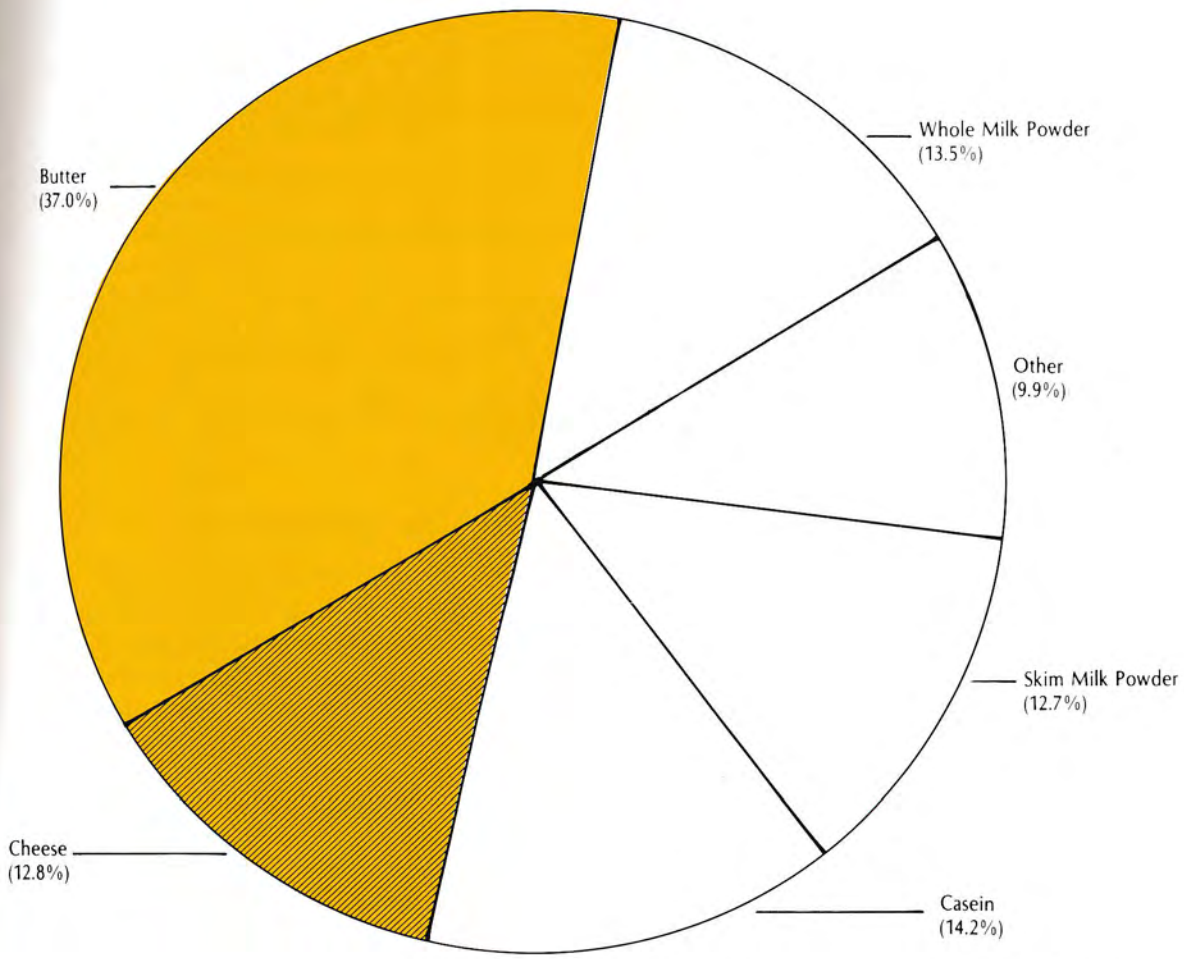
1963 ($NZ 146.0 Million)



1973 ($NZ 333.0 Million)

Infogram 5–II

Infogram 5–III—The Diversification of N.Z. Dairy Exports—*continued*



1983 ($NZ 1512.9 Million)

Source: NZ Dairy Board.

milk and milk products. Five main features are notable:

(i) Milk products as a whole dropped from one-quarter to one-fifth of total exports during the 1960s but achieved a slightly higher proportion during the 1970s.

(ii) The composition of the dairy trade altered considerably. The final consumer products (e.g. butter and cheese) have become comparatively less important. The growth areas have been at the industrial end of the dairy technology spectrum.

(iii) Specifically while butter production has increased in line with total milk output, butter has lost its once pre-eminent position*: from nearly two-thirds by value of New Zealand dairy exports 20 years ago, it dropped drastically in the 1960s. For the past ten years it has accounted for about one-third, as other products, mainly derived from skim-milk, have been developed. Cheese has similarly dropped from one-quarter to one-eighth of the trade, mostly during the 1970s.

(iv) In contrast, large growth occurred in exports of anhydrous milk fat and skim-milk powder, especially in the 1960s and wholemilk powders and caseins, especially in the 1970s.

(v) In recent years, a number of new export products have emerged—UHT milk, ice-creams, yoghurt and the so-called 'Ala' brand products being marketed by the New Zealand Dairy Board—but as yet their quantities are very small.

5.4.3 The following assessment is based on an analysis of current market share and long-term supply and demand projections but also takes into account views expressed by senior executives and officials associated with the milk industry. It is intended as a basis for identifying broad strategic objectives for the marketing of New Zealand milk products.

5.5 Butter and Butter Oil

5.5.1 *Short-Term Market Prospects*

At NZ$557 million, butter and butter oil (AMF and ghee) comprised 8% of total New Zealand 1982 export earnings, the fourth largest export commodity after wool, lamb and beef. Butter markets are narrowly focused: the UK market takes about 50% of the butter exported from New Zealand, while in recent years, the USSR, and the countries of North Africa and the Middle East, notably Iran, Iraq and Algeria, have taken about 80% of the remainder (with considerable annual variation in the quantities taken).

Markets for butter oil are mainly in the countries of South East Asia, the Middle East and Latin America, as an ingredient

* Not only marketing factors but also technological changes at the production end explain this trend. Until the mid-1960s, most dairy farmers in New Zealand did their own milk separation on their farms, feeding the skim to pigs. Only about 50% of the total skim-milk potentially available was collected and processed, and thus a relatively large proportion of butter-fat to total milk was produced. Since then, however, almost all of the milk collection is whole milk and the relative amount of skim-milk-based products produced and marketed has increased.

Infogram 5–IV

Butter and Butteroils: Recent Market Situation

Country	Import Dependency %	Size of Import Market (000 MT)	NZ Market Share 1980–82
Protected Commercial Markets			
EEC (UK)	13	90	100%
Switzerland	26	12	0
Open Commercial Markets			
Egypt	38	44	0
Algeria	98	41	0
Iran	32	28	8
Saudi Arabia	96	24	1
Syria	68	23	0
Morocco	64	21	0
Mexico [1, 2]	38	14	20
Libya	100	12	0
Indonesia [2]	100	11	63
Malaysia [2, 3]	107	11	45
Singapore [2, 3]	160	10	41
Philippines [2]	100	9	49
Nigeria	55	9	88

[1] Includes food aid and purchases on concessional terms
[2] Mainly butteroil
[3] Includes imports for re-export

with skim-milk powder in recombined milk. In 1982, significant markets were Peru (NZ$24m), Indonesia (NZ$21m), Malaysia (NZ$15m) and the Philippines (NZ$13m).

5.5.2 *The Framework*

FAO statistics of total cross border movements of butter and butter oils in 1981, show New Zealand's share as 3.6%. But with the removal of intra-EEC trade and of butter and butter oil for food aid, the total international commercial butter and butter oil market in 1981 amounted to 730,000 tonnes of butter equivalent, of which New Zealand's share was 230,000 tonnes or 31.5%. The EEC supplied about 430,000 tonnes or 59%, with the remaining 10% coming from all other suppliers (Australia, Canada, Eastern Europe, etc.).

5.5.3 The period 1980 to 1982 is the most recent for which comprehensive and consistent data are available. Since then, New Zealand butter exports to the Middle East and North Africa have increased significantly. In the trading year to the end of April 1984, New Zealand exported 31,000 tonnes to Iran, 1,260 tonnes to Algeria, and 8,600 tonnes to other countries in the region.

5.5.4 In addition to the countries identified above, the USSR has purchased annually between 150,000 and 250,000

tonnes of butter from all sources over the last four years, with New Zealand supplying up to 30% of USSR requirements over the period. However, the USSR is an unreliable market and whilst valuable as a residual market, has been excluded from consideration as a strategic market.

5.5.5 FAO statistics identify India as a significant butter-fat importer. However all but a tiny proportion is food aid, and India cannot be regarded as offering any significant commercial prospects in the short term.

5.5.6 *The Interpretation*

In the context of the general growth patterns discussed in Chapters 1 and 2, demand and increasing import dependence can be expected in Iran, Saudi Arabia, Syria and the four North African countries of Egypt, Algeria, Morocco and Libya. This concentration of demand growth about the Mediterranean and Persian Gulf will require New Zealand to compete directly against EEC suppliers. This will involve, in addition to the usual EEC export subsidies, the hurdle of relatively higher freight costs in order to compete in those markets. Nevertheless, the viability of the New Zealand dairy industry is heavily dependent on the remunerative export of around a quarter of a million tonnes of butter and butter oil annually. Since the quota to the UK and the proximate markets in the Pacific are clearly inadequate, New Zealand will need to take a growing share of the North African and Gulf State markets. New Zealand export trade figures for 1983/84 to April indicate that there has already been some movement in this direction. Shipments to Middle East/North African countries have increased to 41,000 tonnes from 6,800 tonnes in 1981/82 and 9,700 tonnes in 1982/83.

5.5.7 Currently butter presents probably the most difficult marketing problem confronting any of our established export commodities. The viability of any manufacturing dairy industry rests on its ability to find remunerative markets for milk-fat. For the New Zealand dairy industry, this is especially so and the reliance on technical innovation and product development is crucial. The protein side of the processing industry offers exciting prospects for technical innovation and product development, but the future level of milk protein usage is unlikely to be sufficient by itself to sustain the future of the country's dairy industry, at least in the short to medium term. A market collapse for butter-fat products could not be adequately offset by the returns currently available for milk protein products. As already outlined, the demand for butter and butter oil in international trade is very limited. The loss of a major butter market for New Zealand would pose severe problems which, if no alternative outlet can be found, could jeopardise the viability of the industry in its present form.

5.5.8 A basic element in New Zealand's overall strategy must therefore be retention of as large a share as possible of the British butter market, while actively seeking to establish and develop significant markets where we have hitherto had limited presence. A supplementary element is the development, with the other major suppliers, of better co-operation in marketing and disposal arrangements.

5.5.9 Figures referred to earlier show the extent to which butter markets have contracted in recent years while surpluses

have increased. Further reduction of the UK quota only increases the quantities New Zealand must sell in other markets in competition particularly with EEC traders.

5.5.10 Outside the EEC, the future trend in USSR import demand is uncertain and the USSR cannot be relied on as a stable or predictable outlet. In the longer term, further expansion of demand can be expected in the Middle East/North African area including Iran, Saudi Arabi, Algeria, Libya, Egypt and Morocco. In the Western Pacific Seaboard, West Africa and in the Pacific, some increased imports of retail packed butter may occur. But the development of all these markets will require intensive marketing efforts in the face of aggressive competition from other suppliers. Success will depend on price competitiveness, continuing adjustment to changing supply and demand conditions and the political relationships prevailing between importing and supplying countries. It will also depend on the effectiveness of longer-term marketing strategies aimed at increasing consumption of dairy products, particularly in mid-income and newly industrialised countries.

5.5.11 *Butter Oil*

The price of butter-fat, in relation to competing vegetable oils is the major limitation on increasing sales of anhydrous milk fat (AMF) for milk reconstitution. Vegetable oils have a clear price advantage, and although AMF is generally the preferred product, the cost disadvantage faced by butter-fat cannot readily be overcome. In the short term, increased sales of AMF and ghee will come more as a result of aggressive marketing in order to increase market share, than as a consequence of growth in aggregate demand. Nevertheless, the demand for milk in Islamic countries, especially during the fasting (Ramadan) period is growing and with comparatively greater prosperity in the oil-producing Islamic countries, as against other developing countries, the preference for the use of AMF in milk recombining can be fostered.

5.6 Cheese

5.6.1 *The Framework*

FAO statistics of cross-border flows show New Zealand as having only 5.2% by volume of the total international movement of cheese. As with butter and butter oil, this is a deceptive statistic. It is necessary, as for the rest of the dairy trade, to exclude intra-EEC trade from the total. Morever cheese, as a commodity, does not exist—it is a convenient heading for a range of products of the fermentation of milk. New Zealand's cheese exports are predominantly cheddar and contribute to the world's trade in hard and semi-hard cheeses—including such other varieties as Edam, Gouda, Parmesan, colby, etc. Hard and semi-hard cheeses also provide the major feed-stock for processed cheese, and therefore the trade in processed cheese needs to be taken into consideration. The remaining part of the cheese trade is in soft cheeses, ranging from French style cheeses, e.g. Camembert, to feta, cream and cottage cheeses. For a variety of historical, technical and freight cost reasons, New Zealand has not been a significant exporter of soft cheeses, although research and product development in this area is now occurring.

Infogram 5–V

The International Market for Cheeses

Country	Total Market	Size of Import Market (000MT)	N.Z. Market Share 1980–82
Protected Commercial Markets			
USA	5	112	13
EEC	3	106	11
Switzerland	25	21	0
Canada	9	20	4
Open Commercial Markets			
Japan	84	71	35
Iran	31	41	0
Saudi Arabia	107	39	0
Egypt	6	17	0
Australia	15	13	39
Libya	100	12	0
Algeria	93	11	0

5.6.2 Cheese is a perishable product—hard cheeses have shelf lives between six months and two years, with flavour normally becoming stronger with age. Depending on the end use of the product—and for New Zealand more than 50% of its cheese exports are as a feedstock for processed cheese where strong flavour is a disadvantage—most New Zealand cheese is exported within three to 12 months of manufacture. Total production is limited by market demand, with production heavily concentrated on cheddar.

5.6.3 The international trade in hard, semi-hard and processed cheeses in 1982 totalled 680,000 tonnes, of which New Zealand's share was around 12% (81,000 MT). The EEC provided 362,000 tonnes (53%) and all other suppliers 35% (236,000T).

5.6.4 Major markets consist of higher-priced quota restricted markets in the USA, EEC and Canada and open import markets of which Japan is predominant. Infogram 5-VI sets out the main features.

5.6.5 The protected commercial markets offer no real prospect of expansion, even though the proportion of imports in relation to consumption is generally small. Apart from Japan and Australia, the other significant markets identified lie in the North African/Middle East area. Demand for hard natural cheeses, such as cheddar, is limited in these markets, which are predominantly markets for processed cheese and more particularly, in Iran, for feta

cheese. This latter variety is a white soft cheese with a high moisture content, traditionally produced from goat or sheep's milk. Denmark currently supplies Iran with large quantities of feta made from cow's milk.

5.6.6 *The Interpretation*

The market for cheese is best analysed in terms of conditions of access to importing countries with regard to the varieties of cheeses imported. These markets are as follows.

5.6.7 *The Quota Markets*

As identified in Infogram 5-V, quota markets, with the exception of Canada, offer no short-term expansion prospect. In Canada, some expansion may be possible as import licences are not country specific and New Zealand has some opportunity to compete for the segment available to imports from non-EEC sources.

5.6.8 *The Markets Open to Competition*

(a) *Markets controlled by tender or central purchasing*

These markets are located mainly in North Africa and Iran and amount to a very significant 40,000 MT. Although open to New Zealand, the scope for market penetration is limited by the need to develop processed cheeses which conform to rigid and highly individualistic product specifications. Moreover in these markets, New Zealand must compete with EEC suppliers who have the advantages of proximity and familiarity with product demand. Nevertheless, New Zealand exported cheese to Algeria in 1983. Other markets which also fall into this category include the USSR and Eastern European countries, but until now, these countries have tended to be intermittent buyers.

(b) *Markets open to free competition*

Japan, the countries of the Pacific Basin, Latin America, Asia and Africa variously fall into this category. The largest is Japan, New Zealand's foremost market for cheese, accounting for 25,000 tonnes of a total Japanese import requirement in excess of 70,000 tonnes. However, Japan is largely a bulk commodity market for cheese and about 70% of all natural cheese imported is used in the manufacture of processed cheese. This leaves only limited opportunities for New Zealand to develop market loyalty in the comparatively small natural cheese sector.

5.6.9 The import markets of Latin America and the Caribbean supplied by countries outside the region account in total for over 10,000 tonnes of various cheeses. New Zealand's market share currently is around 3,000 tonnes and is concentrated in the Caribbean. Much of the remaining demand is met by EEC traders exporting non-cheddar varieties, particularly Edam and Gouda type cheeses and also processed cheese. Increased diversification in cheese manufacture away from cheddar could permit New Zealand to take an increased share.

5.6.10 Opportunities for developing brand-based retail trading are being developed, especially in Australia for natural cheese, and in the Middle East, South East Asia and the Pacific, for processed cheese. Opportunities for rapid expansion in the Australian market are limited. There is, however, considerable potential for expansion of retail pack sales, particularly for processed cheeses in the Middle East and Asia, provided products are tailored to consumer demands in flavour, presentation and price.

Infogram 5-VI

Exports of New Zealand Cheese 1982—By Destination

Region	Natural Cheese	Processed Cheese (000 tonnes)	Total
Middle East	66	60	126
Africa	25	15	40
Japan	72	—	72
Central & South America	34	4	38
Other	53	11	64
	250	90	340

5.6.11 The perishability of cheese means a closer balance between supply and demand must be maintained than in the case of butter or skim-milk powder. Thus, demand will determine the production and the level of supply of cheese available for export.

5.6.12 Cheese, because of its flavour range and protein content, is a product which lends itself readily to the application of marketing skills to develop quality and brand loyalty. As already pointed out, cheese is not a uniform commodity. Apart from the basic difference between processed and natural cheese—and the fact that markets can be broadly divided between them—each major category is made up of a considerable diversity of products. Cheddar cheese, the predominant variety produced in New Zealand, is one of a number of semi-hard to hard varieties traded internationally, including Edam, Gouda, Swiss and Italian type cheeses like Parmesan. Each variety differs in flavour, texture and method of manufacture and some markets and market segments prefer some varieties over others. Processed cheese can be produced with varying degrees of plasticity and a wide variety of flavour additives can be introduced to give a further wide range of products. The other major sub-category of natural cheese is natural soft varieties, and these are now being developed in New Zealand for export.

5.6.13 Overall, total world exports of cheeses amount to some 700,000 tonnes annually, of which 550,000 tonnes is of hard varieties and processed cheese, and the remainder soft cheeses. Of the total trade in hard and processed varieties, 210,000 tonnes goes to markets where access is tightly controlled, leaving a trade of about 340,000 tonnes which is open to competition. It is only in this latter category that any growth may realistically be expected. These 'open' markets can be grouped regionally as shown in Infogram 5–VI, based on trade figures for 1982.

5.6.14 The competitive trade in natural cheese can be broken down further into four main types as follows:

Infogram 5-VII

Exports of New Zealand Cheese 1982—By Type

	Total (000 tonnes)	NZ Share %
Cheddar	75	47
Swiss	10	—
Brine salted*	90	14
Other	75	3
TOTAL	250	

* Edam/Gouda type cheese

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5.6.15 Demand for varieties other than cheddar is often heavily influenced by the origin of manufacture—some varieties, e.g. Emmenthaler, being closely associated with individual countries and even regions within countries. New Zealand's cheese manufacture is heavily biased towards cheddar, due in part to historical factors, and in part to the disadvantages of higher per unit initial investment and production costs associated with the low volume output of non-cheddar varieties. However, significant market access and prospects for increasing demand exist, especially for mild flavoured elastic textured cheeses, such as Gouda and Edam, in North Africa, Asia and Latin America. New Zealand could usefully investigate further the possibilities of diversifying cheese production for markets in these areas.

5.6.16 For processed cheese, the largest regional markets are in the Middle East and in North Africa—regions which have significant growth potential. Currently of the total combined import demand in these regions of 75,000 tonnes of processed cheese, about 40,000 tonnes is bought annually, by tender, by central purchasing agencies. The cheeses concerned are mainly processed cheeses, manufactured from low grade or reject natural cheese with a very high water content. Up to now, New Zealand has taken no part in this business, being unable either to compete with subsidised exports from European Community suppliers, or to meet the 'idiosyncratic' product specifications demanded.

5.6.17 The remaining estimated import demand for 35,000 tonnes of processed cheese in these regions, and around 14,000 tonnes elsewhere in the world, is for processed cheese products which New Zealand has the experience to manufacture and of which an expansion of New Zealand exports is planned. Australia has had considerable success in penetrating the Middle Eastern market for processed cheeses and New Zealand could well aspire to take an increasing share.

5.6.18 To date, New Zealand has exported virtually no soft cheeses. Much of the demand for soft cheeses is for high quality and high-priced varieties such as Camembert, to which considerable country origin loyalty is attached. The quantities sold are generally small in relation to total cheese consumption. However, a major exception is the white cheese such as feta, consumed in volume in the Middle East and Mediterranean areas. Iran imports around 80,000 tonnes of feta per annum and Denmark is the major supplier. The possibility of producing feta and other such types of cheese in New Zealand is currently being assessed.

5.7 Fresh Whole Milk

5.7.1 New Zealand's fresh milk, liquid milk or UHT exports (9000 MT) constitute only a tiny proportion of the world's trade in fresh milk (about 0.4%). Distance from the main fresh milk markets, even outside the dominant European market, constrains New Zealand's ability to supply on a competitive basis, because of the extra volume and weight of liquid milk and the higher transport costs involved. Nonetheless, Australia has secured for itself significant market shares in some areas.

5.7.2 Infogram 5-IX identifies the main significant fresh milk markets and New

Zealand's share of them. Although dominated by the European Community, the Saudi Arabian market is evidently accessible to Australia. The Tunisian market is almost wholly supplied by a near neighbour, Italy, as the Yugoslavian market is by Hungary. New Zealand enjoys a dominant position in the US market, primarily because we have the only quota access (frozen cream to Hawaii). However, Canada has a significant share of the US market, no doubt concentrated in the eastern states. In general, there would not seem to be great possibilities at this stage for short-term market expansion in fresh milk markets except in the very limited markets in the Pacific Island states.

5.8 Preserved Milk—Milk Powders and Packaged Concentrated Milks

5.8.1 As for butter and cheese, for these products it is necessary to refine the FAO data base to exclude intra-bloc trade and identify more clearly the specific markets open to New Zealand. Additionally, it is necessary to break down the FAO statistics agglomerated under the heading 'preserved milk' into their constituent parts:

Skim-milk Powder
Wholemilk Powder and Infant Foods
Condensed and Evaporated Milks.

These products differ significantly in terms of general specifications, end uses and market structure, to the extent that they can, for practical purposes, be considered as virtually separate markets.

5.8.2 Of the three product categories identified, New Zealand exports relatively large quantities of skim and wholemilk powders. It is not a significant supplier of condensed and evaporated milks—due to the high water content and consequent freight costs. Small quantities are exported to Australia and around the South Pacific. The development of paper aseptic packs for milk have of late improved the economics of evaporated milk exports, and these can be expected to expand, mainly to South Pacific markets and into Australia.

5.9 Milk Powders—Skim-milk Powder (SMP)

5.9.1 Spray-dried skim-milk powder makes up the largest part of the preserved milk traded internationally. Skim-milk powder is one of the products used in food aid and therefore it is necessary to deduct donations for food aid to isolate real commercial international trade in SMP. Skim-milk powder is manufactured in New Zealand to a wide variety of speci-

Infogram 5-VIII

Import Markets for Fresh Whole Milk—1982

Import Dependency	Country	Import Market Size (000MT)	N.Z. Market Share
1%	Saudi Arabia	35.5	0.43%
1%	Tunisia	22.3	0
0.4%	Yugoslavia	18.9	0
0	USA	8.7	73%

The USA is a major food aid donor in preserved milk.

Source: U.N. Commodity Trade Statistics

fications depending on end use and individual customer demand. The premium market is for SMP for recombining into fluid milk for human consumption. Alternatively SMP can be sold as an ingredient for stock feeding.

5.9.2 For human consumption uses, major markets for New Zealand are in South East Asia, particularly the ASEAN countries and Mexico and Peru in Latin America. Sales are growing in the Middle East. Japan is a major market for SMP for animal feed, and New Zealand has on occasion sold significant quantities into that market.

5.9.3 SMP is mainly traded as a bulk commodity product and although sales success is closely allied to price competitiveness, the development of individual specifications for particular customers and stability in supply can earn buyers' loyalty.

5.9.4 Over the three years 1980 to 1982, exports of SMP (including food aid) from all countries declined from 977,000 tonnes to 875,000 tonnes, a decline of 10% in total. Both the proportion and quantity of skim-milk powder exported as food aid expanded—from 194,000 tonnes to 250,000 tonnes. The commercial market contracted from 783,000 tonnes to 625,000 tonnes—a contraction of 20% with the main effect falling on EEC exports. Over the same period, New Zealand edible SMP exports declined from 164.7 thousand tonnes to 141.3 thousand tonnes but its share of international trade increased from 21% to 23%.

5.9.5 Most SMP is imported by developing countries, and there is no significant quota market trade in skim-milk powder. All New Zealand SMP exports are to markets open to free competition—be that through central purchasing or tender control (as for example in Peru, Algeria or Iran), or through direct competition in the open market as in much of South East Asia and the Arabian Gulf.

5.9.6 SMP markets can be categorised in accordance with the end use of the product—either for human consumption

Infogram 5-IX

Import Markets for Skim-milk Powder—1982

	Market Situation 1982	
Skim-milk Powder Markets for Human Consumption	**Import Market Size (000 Tonnes)**	**NZ Market Share (%)**
Philippines	54*	50
Indonesia	30*	73
Malaysia	23	56
Thailand	14	73
Peru	30	64
Mexico	69*	16
Iran	10	—
Algeria	38	—

* Includes aid

Source: Derived from offical country export statistics

recombined with milk-fat or vegetable oil to make drinking milk and various other milk products, or as animal feed as a protein ingredient of feed for calves and pigs.

5.9.7 Japan is the largest market for SMP for animal feed. Human consumption needs are largely met by domestic production and market access for human feeding is severely restricted.

5.9.8 Prospects for growth in developing countries in demand for SMP for human consumption are very dependent on the availability of foreign exchange. While increasingly milk is regarded as an important food item, it must compete initially for scarce foreign exchange and then for its share of consumer spending. Although most Asian countries expect steadily expanding demand for dairy products, the development of domestic dairy industries will be a major factor in determining import demand. Markets for SMP as an ingredient for recombined milk are rapidly growing in the Middle East and North Africa and, as increased prosperity filters through the population, demand should expand further.

5.10 Wholemilk Powders (WMP)

5.10.1 Because of the limited shelf life of WMP, it is normally manufactured against firm orders only. Growth in demand depends on price competitiveness with recombined and fresh milk and also the functional properties of the product. Consumers seek a powder which will combine with water instantly, regardless of water temperature, and produce a product indistinguishable from fresh milk. With continuing technical development, New Zealand wholemilk powders are getting closer to this ideal.

5.10.2 Unlike SMP, WMP is an important vehicle for retail brand marketing, and this assists in the development of customer loyalty and lifts the trade out of the straight commodity area.

5.10.3 Import demand for WMP expanded during the late 1970s as technically superior products became available, and as consumer incomes expanded in developed countries, giving an end product much closer to natural pasteurised whole milk. The international recession from 1982 brought some contraction in WMP demand and some substitution has occurred, e.g. with cheaper products incorporating vegetable oil instead of milk-fat.

5.10.4 Total commercial exports of WMP over the three years 1980 to 1982 averaged around 720,000 tonnes but are estimated to have contracted by about 100,000 tonnes in 1983. New Zealand exports in the same period expanded from 73,000 tonnes (10%) to 117,000 tonnes (16%) and are currently around 120,000 tonnes annually.

5.10.5 Over the three years 1980 to 1982 the EEC share of WMP has averaged around 70% while New Zealand is the next largest supplier and Australia third. The three together now supply about 92% of the market.

5.10.6 Major markets for WMP include the same group of countries importing SMP, although WMP is a product increasingly sold directly at retail rather than as an industrial raw material. Significant markets for WMP exist in Latin America,

Infogram 5-X

Import Markets for Wholemilk Powder—1982

Country	Import Market Size (000 Tonnes)	NZ Market Share (%)
Venezuela	60	26
Saudi Arabia	39	—
Iraq	29	5
Taiwan	27	24
Malaysia	26	35
Nigeria	22	7
Mexico	22	29
Philippines	20	14
Sri Lanka	12	18
United Arab Emirates	10	—
Algeria	10	—

Source: Derived from offical country export statistics

including Venezuela, Chile, and Peru. The Middle East and North Africa have large demands for milk which reach a seasonal peak during the Islamic fasting month of Ramadan. Potential exists for New Zealand to increase WMP exports to this region to nearer the proportion of the market it has obtained in South East Asia and Latin America.

5.10.7 The main country markets for WMP are broadly the same as those for SMP. Depending on the development of individual milk recombining industries and the extent of consumer market development for home sales of wholemilk powder, some markets have shown a growing preference for WMP. Venezuela is one country which imports considerably more WMP than SMP and New Zealand has a significant share of that trade.

5.11 Evaporated and Condensed Milk

5.11.1 Because of relatively high transport and canning costs, these products do not contribute significantly to New Zealand's dairy export income. The development of cheaper paper packaging for evaporated milk in particular may permit some expansion of sales mainly in the Pacific region. Sales further afield may also become economic, however the freight penalty associated with shipping extra water, as against dry products, still exists. It may be possible to develop the manufacture and canning of these products at a location closer to their markets, e.g. in Singapore, using SMP and AMF from New Zealand.

5.11.2 However, with the development of ultra high temperature treated whole milk and recombined whole milk, the demand for condensed and evaporated milk is likely to continue to decline—UHT products offer advantages of long shelf-life at ambient temperatures (like condensed and evaporated milks), but UHT milk is much closer in taste and function to fresh whole milk than the condensed /evaporated alternative.

5.12 Casein and Milk Protein Products

5.12.1 With the important proviso that remunerative markets are maintained for milk-fat-based products (butter, cheese, WMP), it is in the markets for newer types of milk protein products that the most exciting new opportunities exist, particularly for caseins and caseinates, whey and milk protein products. New Zealand has become a world leader in the application to the dairy industry of new developments in food science and technology. In the past decade, caseins and caseinates have more than doubled their percentage contribution to our total export earnings. Casein used to be used only for industrial purposes but in recent years, the uses of casein have expanded rapidly, and it is now used for a very wide range of nutritional, pharmaceutical and industrial products.

5.12.2 Caseins are concentrated sources of animal protein, and are therefore particularly useful for stock-feed. If manufacturers have access to supplies of cheese whey, an economical and highly nutritious milk replacer can be made from a mixture of whey, casein, milk-fat or animal fat, lime, caustic soda and water, with vitamins and mineral concentrates as desired.

5.12.3 New Zealand sells two to three times more acid casein than rennet casein. The United States, which stopped its own production of casein about 20 years ago, buys well over half New Zealand's acid casein and over four-fifths of its rennet casein. The United States and Japan together take 86% of total casein export sales. Preserving access to the USA is fundamental to the viability of this production—a number of attempts have been made by US dairy interests to restrict or even prevent casein and whey product imports.

Altogether, about three-quarters of New Zealand's caseinates are sold to the United States. The other important markets are Japan and South Korea.

5.12.4 The EEC is the main competitor supplying high quality casein products internationally. Industrial grade caseins are also exported by Poland, and, from time to time, the USSR. Demand is limited essentially to the industrially advanced countries and New Zealand's market opportunities are confined mainly to North America and Japan. Continuing access to these markets is an essential but sensitive issue. The basic marketing strategy must be to move up-market technologically in order to exploit a wider range of market opportunities, while endeavouring at the same time to protect current volume sales of standard caseins and caseinates.

5.12.5 To date, the New Zealand dairy industry has shown considerable dynamism and ingenuity in responding to this challenge. It has developed an array of tailored food ingredients* known as the 'Ala' brand New Zealand products. These include:

Alanates	—sodium, calcium or potassium caseinate
Alablen	—dairy blends
Alacid	—acid caseins
Alaren	—rennet caseins

* See Appendix III "The Nutritional Componentry of Milk and Product Options".

Alatate	—co-precipitate
TMP	—sodium total milk proteinate
Alacen	—whey protein concentrate
Alatal	—lactalbumin
Alaway	—sweet whey powder
Alachez	—creamed and skimmed whey cheese
Alamin	—natural milk salts

These products contributed $240.7 million to New Zealand export earnings in 1983, an increase of 18% per annum since 1979.

5.12.6 The brand promotion and technology-intensive approach inherent in this milk product development illustrates the kind of marketing needed if the New Zealand food export industry is to survive and prosper in the future. Some of the items being marketed are new products, refinements of established products such as caseinates. In some cases, such as TMP, the brand product is not exported from New Zealand, but is manufactured in the foreign market (the USA) on a joint venture basis using New Zealand material, thus boosting casein exports. Through leadership in milk technology, co-operative commercial arrangements such as joint ventures, and the promotion of brand loyalty to New Zealand products, a large potential market is being developed for modern milk ingredient products at the food manufacturing level in many developed countries. An example of this new approach is the Dairy Board's research centre at Petaluma, California and its casein manufacturing plant at Sioux Falls, South Dakota, both established in 1980. The Petaluma laboratory led the world in formulating and developing total milk proteinate. Another example was the promotion in 1982 of a new marketing and distributing company in Japan, Nippon Proteins KK, a joint venture between the Board and its Japanese casein agents aimed at establishing a closer business relationship with food manufacturers and gaining added value for the products marketed.

5.12.7 The marketing strategy for the longer term in this area is aimed at further development and refinement of casein and caseinate technology which will allow New Zealand to move a greater proportion of its production out of the commodity trade into product markets. To retain leadership in milk technology will require considerable financial commitment—not only to meet the capital intensive demands of such research and development, but even to keep producing sufficient highly trained manpower resources. This involves consideration of whether the number of food technologists graduating from Massey University each year (15 to 20) is adequate to meet national needs, not only for research purposes but also to provide the technical background which is becoming an essential requirement in many marketing areas of which the dairy sector is only one.

5.12.8 The fresh milk market is a further area where new technology should offer definite growth opportunities for New Zealand, despite the inherent disadvantages associated with costs of transport.

5.12.9 This diversification has involved some significant changes in the structure of the industry. The Dairy Board's wholly-owned company in Singapore, New Zealand Milk Products (S) Pte Ltd, has entered the competitive but expanding

beverage market thereby taking over the production of 'Milqurt', an acidified or cultured milk drink. Anchor Foods (Pte) Ltd was formed as a subsidiary to develop the Board's consumer pack business there. Elsewhere similar commercial arrangements have been established for the marketing and in some cases the distribution of all the Board's 'Anchor' brand milk products—namely The United Kingdom, Malta, Taiwan, Philippines, Thailand. These are further examples of the trend towards joint ventures with local production and distribution agents in foreign markets, seemingly the best way of ensuring the protection of trade interests in the marketplace and the steady and reliable flow of market information back to New Zealand to the production and processing source.

5.12.10 The new developments in technology and marketing in our dairy industry can only be applauded, but it would be incorrect to conclude that in themselves they constitute a panacea for our trading difficulties. Several considerations act as a caveat. First, the relative importance of Ala brand milk products in the context of total exports is relatively modest at 3.2%*. Even if the rate of growth were very high, the contribution to foreign exchange earnings would still be small for many years to come. The annual increases in dollar returns are in the order of tens of millions only at present and the rate of growth has been higher than that of total exports for the past two years only. Clearly it will be some time before the new technological and marketing skills associated with the casein industry can have a significant impact on overall export earnings and they, like other dairy products, are dependent on retaining market access. Meanwhile, over three-quarters of dairy earnings—over one billion dollars—remains dependent on four major commodities—butter, cheese, and skim and wholemilk powder, where a downturn of 4% on receipts could entirely wipe out the benefits of growth in the newer product areas.

5.12.11 This is not to belittle the value of recent achievements, but in perspective it must be recognised that their real value lies in their potential earning capacity in the 1990s and the signpost they provide for other agricultural export industries indicating what can be done.

5.12.12 Continuing growth of exports of these milk derivative products will entail a continuing commitment of financial resources which may well be hard to sustain. Despite accumulated skills and knowledge in the milk industry, New Zealand's national resources in such areas will always be small by international standards and the country may find itself overhauled in dairy technology by European countries, its best efforts notwithstanding.

5.12.13 In production terms, the farming component of the dairy industry faces constraints on expansion imposed by increasingly competitive land use alternatives and by local seasonal factors. Difficulties could arise if attempts were to be made to encourage an expansion of the industry. Although milk output could be expanded if the season were extended,

* It is, however, approximately equal to total horticultural exports as a share of total exports.

this would involve increased production costs associated with higher feeding costs over the winter period. Returns based on the prices offered by subsidised competing suppliers would be insufficient to cover such costs. But these are essentially production considerations: the fundamental point highlighted by this study is that market prospects at this point in time do not justify investing resources in a national expansion of milk production.

5.13 Longer-Term Market Growth Opportunities—For All Milk Products

5.13.1 Infogram 5-XI depicts long-term growth prospects for global supply and demand for milk products and milk, expressed on a whole milk equivalence basis. All commercially produced animal milk, i.e. cow's milk, buffalo, sheep and goat's milk, is taken into account since, to a large extent, different milks are substitutable. This is clearly evident in countries such as India, Pakistan, Mongolia, Greece, Turkey, Cyprus, Somalia and Libya.

5.13.2 Current excess stocks of dairy products held by government intervention agencies in the EEC and USA are equivalent to just over 30 million tonnes of milk—well in excess of the total available international market. If constant policies and prices are assumed to the end of the century, a projection of recent supply and demand trends derived from FAO data produces a three-fold growth in oversupply (to 95 million tonnes—equivalent to 13% of total world production).

5.13.3 The high cost of carrying excessive stocks has been recognised by the EEC and USA, which have both recently introduced measures aimed at containing growth in milk output. The trend projection to the year 2000 demonstrates the folly of what until recently have been open-ended support policies among the major producers, and it must be regarded as one of the less likely of a number of possible scenarios for the future. If a better market balance can be achieved in the EEC and USA, the supply pressure from surpluses would ease, bringing a recovery in both prices and demand for New Zealand dairy products. However, fluctuations are, and will remain, a characteristic of the dairy market for a long time to come.

5.13.4 The possibility of countries other than the EEC and USA becoming exporters, or increasing their level of exports, will depend on the willingness of governments and/or dairy industries to subsidise dairy exports to the very limited international market instead of cutting back high-cost production. Overall supply pressures on international markets are likely to continue. This does not suggest that a large improvement in price levels or in volumes of dairy exports from New Zealand will be achieved in the future.

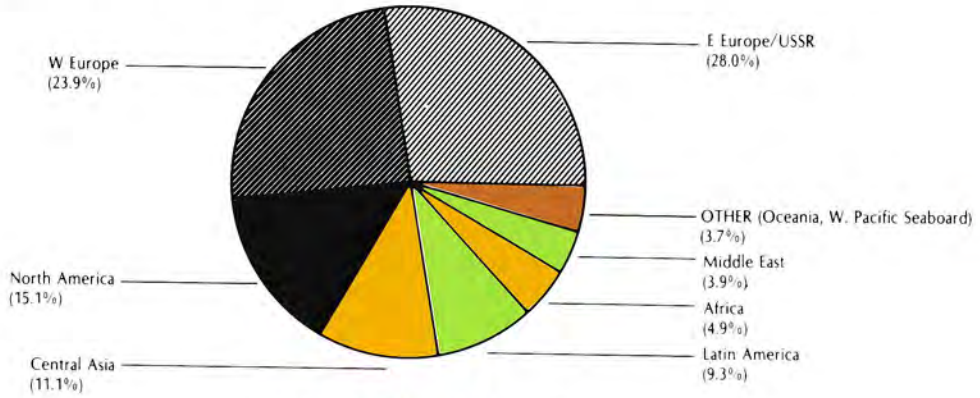
5.14 The Framework

5.14.1 Infogram 5-XI identifies those countries in which current trends suggest significant changes in net import demand in milk equivalence terms. The markets where existing trends indicate strong growth are the USSR, Iran and Egypt in the Middle East/North Africa, Colombia and Brazil in South America, Canada and South Africa. The countries whose net demand seems likely to contract or whose

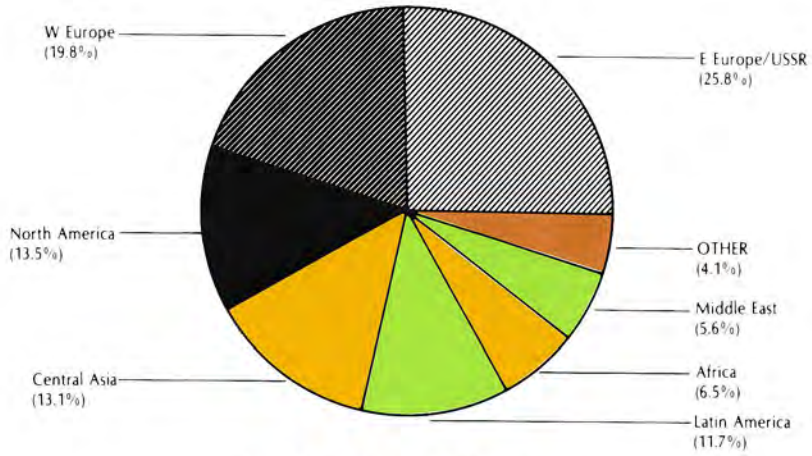
Infogram 5–XI

CRUDE GAP ANALYSIS—MILK & MILK PRODUCTS

(A) SHARES OF PROJECTED NET GLOBAL DEMAND (MILK EQUIVALENCE)

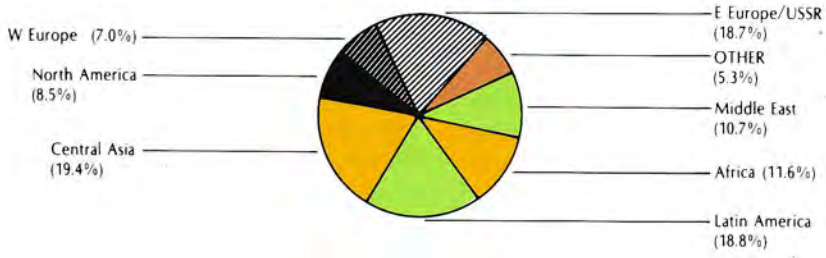


1985 (465.6 Million Tonnes)



2000 (617.0 Million Tonnes)

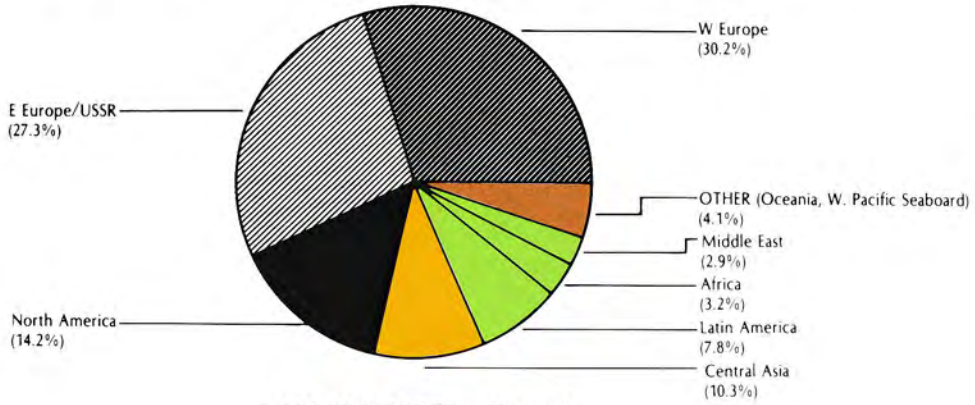
PROJECTED GROWTH OF NET GLOBAL DEMAND



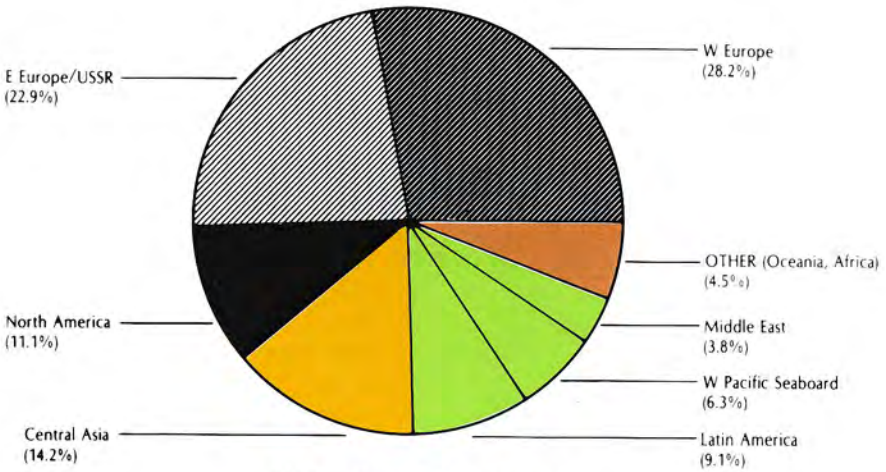
1985–2000 (151.4 Million Tonnes)

Infogram 5-XI—Crude Gap Analysis—Milk and Milk Products—*continued*

(B) SHARES OF PROJECTED NET GLOBAL SUPPLY (MILK EQUIVALENCE)

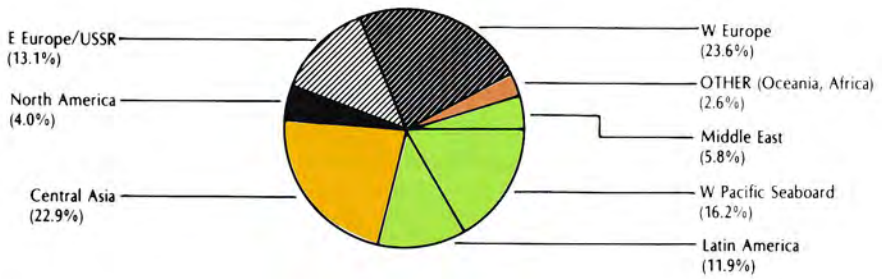


1985 (493.8 Million Tonnes)



2000 (713.1 Million Tonnes)

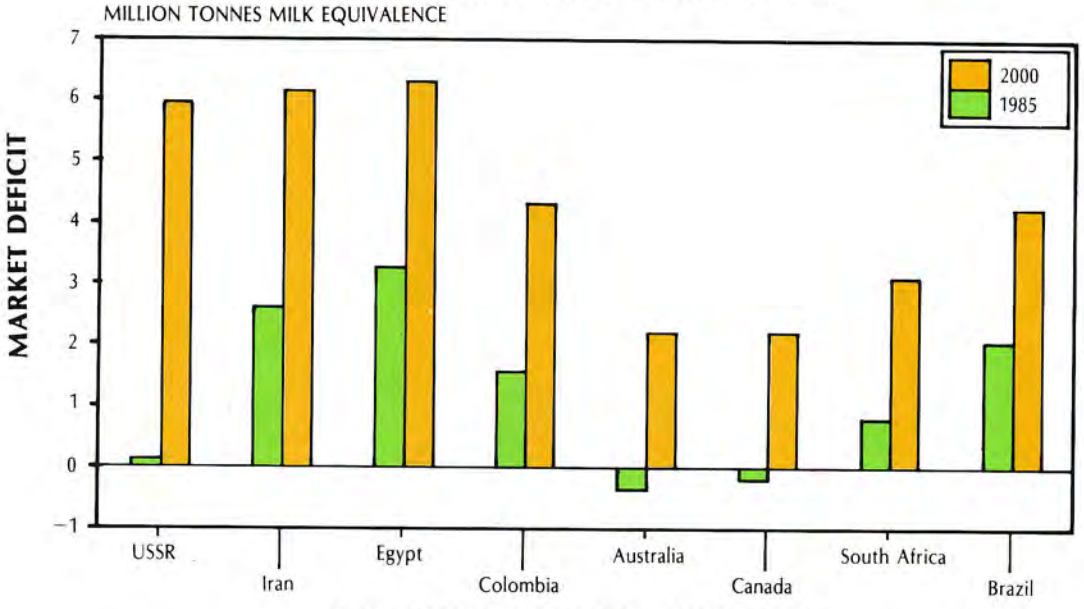
PROJECTED GROWTH OF NET GLOBAL DEMAND



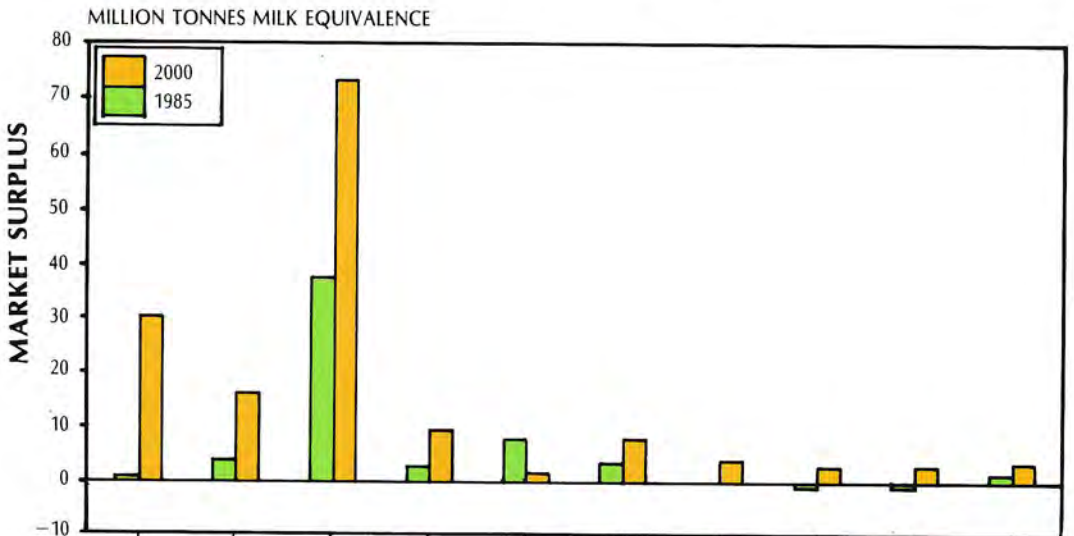
1985–2000 (219.3 Million Tonnes)

Infogram 5-XI—Crude Gap Analysis—Milk and Milk Products—*continued*

(C) LONG-TERM (2000) MAJOR COUNTRY SHARES



NET DEFICIT MARKETS—IMPORTERS



NET SURPLUS MARKETS—EXPORTERS

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5.15 Interpre

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net surplus seems likely to increase are the major dairy exporting countries of the EEC, some countries in the Comecon bloc, Mexico, Saudi Arabia, India, Pakistan, South Korea and China.

5.15 Interpretation

5.15.1 Of the countries identified as having a growing demand for milk, the USSR deserves close attention. In 1982, the USSR was New Zealand's second largest butter market. However during 1983, its total imports of butter from all sources are thought to have declined. The FAO projections of demand growth in the USSR must be regarded with some caution. Moreover total milk production has been constrained in recent years by the availability of feed, and uncertainties exist over the future size of the Soviet milking-cow herd. Nevertheless, failure of production to meet consumption targets may not automatically lead to imports making up the shortfall. The level of imports depends as much on political factors as on the level of consumer demand.

5.15.2 While the Soviet market could conceivably fulfil the 'promise' of the FAO projections, other specific studies, such as one undertaken by the Netherlands Dairy Board, suggest that Soviet self-sufficiency will have increased by the late 1980s. In short, the New Zealand dairy industry cannot rely on the USSR as a reliable market for the medium to long term. Nevertheless, a small shortfall in production in the USSR could result in a sudden surge in demand for imports which could be very large in international trade terms. New Zealand will need to continue to follow closely developments in the Soviet dairy industry in the 1980s.

5.15.3 The South Korean oversupply projection results from two factors. First, the FAO demand projections do not include consumption of butter and cheese and are therefore slightly lower than the true amount. Secondly, South Korea has recorded an exceptionally high average growth rate in milk supply for the past decade, 25% per annum, and even for the most recent three years, 12% per annum. Ironically, this could be construed as testimony to the efficiency of New Zealand's aid programme in dairy development to that country. It is however most unlikely that this rate of growth will continue over the next decade. The base level of production is small, the domestic price level is one of the highest in the world, a manufacturing surplus is already being generated, and moves to restrict production, either through quantity controls or reduced prices, can be expected in the near future. While it is reasonable to conclude from the projections that South Korea cannot be regarded as a longer-term market for milk products, the domestic cost and price structure virtually rule out any possibility that Korea could eventually compete with New Zealand in important Asian markets.

5.15.4 The Australian projections also require close attention. If recent trends were to continue, Australia would become a net importer later this decade, thus rating as a promising potential export market for New Zealand. However, as a result of recent changes in its structure, the Australian dairy industry has become much more efficient and, given favourable conditions, could re-emerge as a potential competitor on world markets. Developments in the Australian dairy sector clearly warrant continuous monitoring.

5.16 Conclusion

5.16.1 Unless there is a fundamental change in current and anticipated trends in supply and demand for milk throughout the world, it is evident that New Zealand should avoid increasing milk production. In the absence of any change in farm support policies, particularly in the EEC and USA, any significant production increase will cause severe marketing problems.

5.16.2 The optimal product mix aimed at maximising net returns per litre of milk produced must be capable of being altered rapidly to meet changes in market requirements. Because subsidised competition will continue, production efficiency and price competitiveness will continue to be key determinants of success. No one product will necessarily have a pre-ordained life of its own in the future. However, the viability of the dairy industry will continue to depend very largely on finding economic markets for milk fat. More flair and ingenuity will be required than ever before in areas such as market intelligence, product switching and promotional skill.

5.16.3 There will need to be a clear identification and formulation of marketing goals. As already indicated, these might be:

(a) To maintain butter exports by fighting further erosion of the European quota, while seeking to penetrate the newer North African/Middle East markets.

(b) To promote the development, production and marketing of the newer 'high technology' milk products of the kind recently developed by the dairy industry.

(c) To identify and develop markets for processed cheeses. This will entail increased research into the types of processed cheeses demanded and existing sources of supply in foreign markets.

(d) To investigate further the potential for the production of a wider variety of natural cheeses.

(e) To continue to explore possible potential longer-term markets for milk products in those countries with population and income trends and dietary patterns which suggest strong growth in future demand for animal-based protein products.

5.16.4 More intensive and more sophisticated marketing will involve the continuing development of marketing skills in the area of milk products. It will involve promotion of brand loyalty, particularly in the new milk product areas, further co-operation arrangements for on-site processing and distribution of our products in foreign markets, and increased investment in both technical and commercial training of the personnel required to carry out marketing functions in foreign countries.

5.16.5 A high priority will need to be given to efforts to maintain technological leadership in milk production and processing. New Zealand must be prepared to devote the financial resources necessary to this end, to university technical training and to research. It is probable the industry will find it necessary to increase its capital expenditure in order to secure ownership or control of key processing plants in foreign countries.

Chapter 6

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Chapter 6 The Market Outlook and Export Growth Prospects for Wool

6.1 Introduction

6.1.1 Wool has been traditionally perceived in New Zealand as an agricultural commodity and, as such, grouped along with meat, dairy products, fruit etc. into an 'agricultural produce' basket. This perception has largely been the result of the unique New Zealand interdependence of wool and sheepmeat production with their common rural base and producer organisational structures. The perception is erroneous. While produced within an agricultural environment, wool is a natural fibre—an industrial raw material. Wool is not a traditional 'consumer product', unlike the other main agricultural products. Perceptions of the role of wool in developing the New Zealand economy should, therefore, clearly differentiate wool from traditional New Zealand agricultural products. This differentiation has important implications in production, sale, distribution, processing and marketing.

6.1.2 As a further consequence, international trading patterns and prices are determined by the interplay of a demand which is very sensitive to general economic conditions and to competition from other fibres, particularly synthetics, and a supply which, in the short term is price inelastic and even in the longer term is relatively unresponsive to price changes. In this situation, the only means of regulating price fluctuations is through the management of stocks. However, the limitations and dangers of such market management must be clearly recognised. Sharp fluctuations can be destabilising for both growers and users but market price trends must be allowed to show through. Stock management should not be used for price forming or as a substitute for sound market development. In practice the major wool producing and exporting countries all operate wool market management schemes based on the acquisition and release of stocks to dampen price movements.

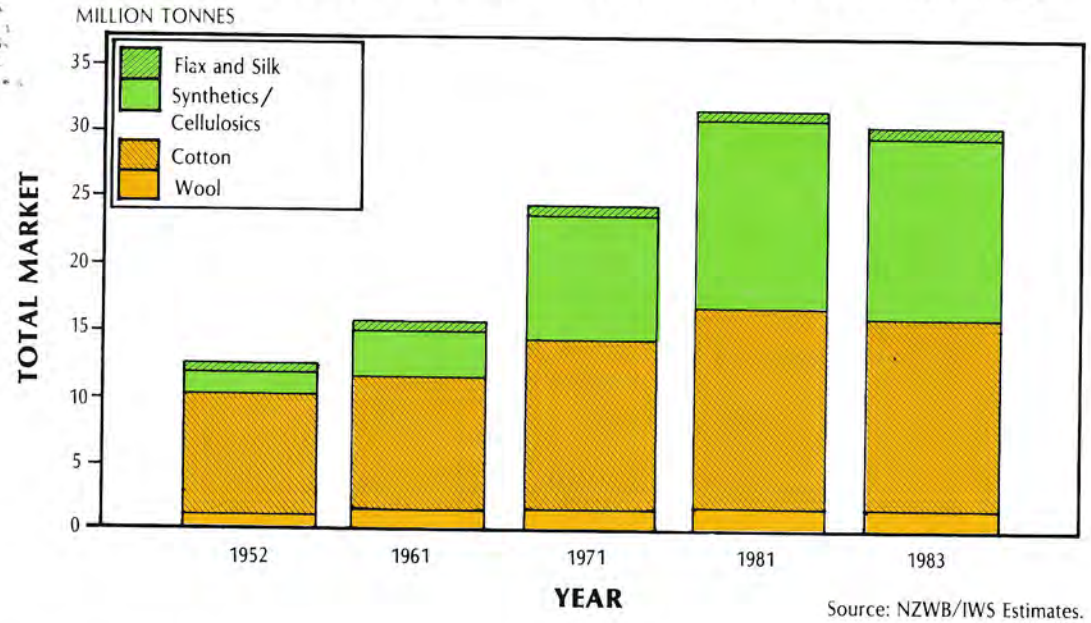
6.1.3 Wool should also be further differentiated from traditional agricultural products in the 'internationalism' of its generic promotion and marketing. Wool, as an industrial raw material, is largely uninhibited by the trade barriers that beset traditional New Zealand agricultural products. Its 'internationalism' has enabled wool to achieve market penetration in both traditional, developing, and new markets, despite intense competition from synthetics and other natural fibres.

6.1.4 The increasingly dominant position of synthetics in the fibres markets (see Infogram 6-I) has put pressure on wool producers to achieve more objective and more uniform quality standards and descriptions in order to win and retain customers amongst the textile manufacturers and other users of wool. The development of objective measurements for wool* would enable New Zealand to improve its competitive position, not only against synthetics but also against countries not able to comply with such specifications. No official estimate exists for the quantified benefits likely to result from the introduction of objective measure-

* These objective measurements describe fibre diameter, vegetable matter, colour, bulk, medulation, length after carding.

Infogram 6–I

WORLD FIBRE PRODUCTION & MARKET SHARES



Source: NZWB/IWS Estimates.

ment. However the benefits are expected to be substantial.

6.1.5 From 1969/71 to 1978/80 world consumption of all fibres increased by approximately 25% from 24.3 million tonnes to 30.3 million tonnes (FAO/IWS statistics). Over the same period, wool's share of total world fibre production fell from over 6% to about 5%. Moreover, since world wool production is projected to increase at less than 1%, an analysis of IWS data and forecasts suggests that its share of the total fibre market will continue to fall to between 3.5% and 4.0% by 2000. On the other hand, New Zealand production is increasing more rapidly than the world average, and it has been estimated that New Zealand's share of the world wool market could increase from about 15% in 1980 to about 19% by 2000. While wool occupies a modest place in the world fibre and textile scene, New Zealand occupies a relatively important place in the world wool market (see Infogram 6-II).

6.1.6 Future demand and prices for New Zealand wool will be determined primarily by those economic and demographic factors influencing total demand for textile fibres for all end uses, and second, by those factors, including marketing strategies, influencing wool's share of the market for each category of product. In this light, New Zealand's export prospects and returns are likely to be influenced more by external and qualitative factors than by the quantity of wool produced.

Infogram 6-II

Production of
(000M Tonnes c

Australia
New Zealand
USSR
Argentina
China
South Africa
Uruguay
Turkey
United Kingdo
USA
Other Africa
Pakistan
Other

Source: N.Z.W.B.
wealth Secretariat
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Infogram 6-II

Production of World Wool 1982/83 (000M Tonnes clean basis)

Australia	451	(27.5%)
New Zealand	274	(16.7%)
USSR	188	(11.4%)
Argentina	107	(6.5%)
China	78	(4.8%)
South Africa	66	(4.0%)
Uruguay	58	(3.5%)
Turkey	32	(2.0%)
United Kingdom	35	(2.1%)
USA	29	(1.8%)
Other Africa	22	(1.3%)
Pakistan	20	(1.2%)
Other	283	(17.2%)
	1643	(100.0%)

Source: N.Z.W.B. Using data from IWS, Commonwealth Secretariat, IWTO and International Wool Study Group.

6.2 New Zealand Wool

6.2.1. The New Zealand wool industry is largely based on a dual purpose sheep—a high-yielding crossbred developed to suit our climate and topography and to produce both meat and wool. As a result of this emphasis, New Zealand wool is predominantly coarse, with around 70% of the clip being coarser than 32 microns in diameter. This coarse characteristic has evolved over a long period and is likely to continue to dominate production in the foreseeable future, predisposing much of the fibre to end-use products such as carpets (see Infogram 6-III).

6.2.2 New Zealand is the second largest wool producer in the world and is the dominant coarse wool producer, accounting for around 45% of total coarse wool supplies. Moreover, of internationally traded coarse wools, New Zealand accounts for around 70% of total volume.

6.2.3 New Zealand wool is of high quality by international standards, having good colour and a low level of vegetable matter contamination.

6.2.4 Coarse and fine wools are generally used in separate end-use sectors; crossbred wools are not usually suitable for light woollen or worsted apparel, but they are ideal for carpet yarn, upholstery, bedding, heavier woollen knitwear and hand knitting yarn. While there is scope for substitution of differing wool types in the manufacture of a particular product, there is as yet no internationally recognised objective measuring system avail-

Infogram 6-III

Estimated End Use of New Zealand Wool[1] (1981)

End Use[2]	
Carpets	60.0
Non-Apparel Special Products[3]	14.0
All Non-Apparel	74.0
Hand-knitting Yarn	6.9
Knitwear	6.7
Womenswear	5.0
Childswear/Retail	3.5
Piecegoods/Socks/Underwear	
Menswear	3.2
Apparel Special Products[4]	0.7
All Apparel	26.0
All End Uses	100.0

Source: N.Z. Wool Board

Notes:

(1) In major consuming countries: Belgium, France, Italy, Japan, Netherlands, UK, USA, W.Germany, Austria, Canada, Greece, Hong Kong, India, Korea, Scandinavia, Portugal, Spain, Switzerland, Taiwan and Turkey

(2) No authoritative information is available for final end uses of all NZ wool

(3) Including blankets, upholstery, felts, quilts, mattresses

(4) Uniforms, protective clothing

Infogram 6-IV

Major Initial Destinations of New Zealand Wool

Clean Equivalent Tonnes

	1979–80	*1980–81*	*1981–82*	*1982–83*	*1983–84*	*Total (5 years)*	*% of Exports*	*% of Total Production*
Japan	25,228	21,065	32,878	30,152	34,128	143,451	11.1	10.3
United Kingdom	24,493	24,817	28,188	34,187	31,532	143,217	11.1	10.3
USSR	32,468	21,871	28,613	26,254	24,675	133,881	10.3	9.6
China	11,447	26,652	19,717	31,776	19,730	109,322	8.4	7.8
France	21,412	16,856	15,535	12,914	20,361	87,078	6.7	6.2
Netherlands	14,185	15,752	15,242	18,820	11,485	75,484	5.8	5.4
Germany	17,064	14,706	12,693	12,594	14,626	71,683	5.5	5.1
Iran	14,921	18,367	7,041	16,399	12,930	69,658	5.4	5.0
Italy	13,944	10,959	11,515	9,134	12,152	57,704	4.5	4.1
USA	9,272	9,064	8,106	8,214	14,946	49,602	3.8	3.6
Australia	8,438	7,229	9,406	8,303	9,514	42,890	3.3	3.1
Greece	12,804	8,034	7,347	7,123	7,087	42,395	3.3	3.0
Belgium	6,577	6,740	8,287	10,568	9,865	42,037	3.2	3.0
Total Exports	254,345	245,478	248,530	278,561	267,858	1,294,772	100.0	92.8
N.Z. Mill Purchases	15,626	16,423	20,683	19,334	28,370	100,436	–	7.2
Total N.Z. Wool Production	269,971	261,901	269,213	297,895	296,228	1,395,208	–	100.0

Source: New Zealand Wool Board.

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6.2.5 Any increase in New Zealand production of speciality wools would be small compared with the world total and, because it would be gradual, would have little effect on the price received. There are advantages in being the major supplier in a familiar and clearly defined market. Specialisation within coarse wools, and improving their characteristics is, therefore, likely to provide better rewards than attempts to move to finer wool types.

6.2.6 In 1983/84, raw wool accounted for 13% of New Zealand's export income, and wool exports were dispersed widely among a range of markets. In 1982 wool accounted for 11 of our 35 top country commodity markets —Japan at $122m was our fifth largest, followed by Britain ($98m), USSR ($87m), China ($85m), France, Netherlands and West Germany ($50m), Italy ($46m) and Korea, Belgium and USA ($30m).

6.2.7 Most of the 12 largest customers for New Zealand wool have been major buyers over a long period (see Infogram 6-IV). Newcomers are China and Iran, which has become a large, if unpredictable, buyer in recent times. While the USA showed a major decline during the 1960s, it subsequently stabilised and more recently has shown a significant upturn. However, export destinations do not necessarily represent consumption; some wool will be transhipped from major ports of convenience to manufacturers in other countries and much of the processed wool is for export to other markets (e.g. Japan, Italy, Belgium). The identification of final regional consumption is therefore difficult and the New Zealand Wool Board has only an approximate idea of the geographic distribution of the end users of New Zealand exports.

6.3 Demand for Fibres

6.3.1 The demand for fibres derives mainly from the demand for apparel, home furnishings, including carpets and drapes, and industrial textiles. Total fibre consumption is essentially a function of economic growth. Prior to 1973, when world economic growth rates were higher, total fibre consumption was growing at a rate approaching 6% per year. However, since 1973, clothing and textile demand and overall fibre consumption have grown much less rapidly and the IWS has estimated future growth at between 2% and 3% per year, at least until 1987. (Consumption actually fell by 2% per annum between 1980 and 1982.) Growth of total fibre demand is forecast to be fastest in the non-apparel sector (about 6% per year), while the major apparel end users—knitwear, menswear and womenswear—are expected to experience an annual growth of 2% per year.

6.3.2 Infogram 6-I indicates the dramatic growth in the 'synthetics' share of the fibre market over the last 30 years to the extent that by 1983, synthetics accounted for over 45% of the market. Of the natural fibres, cotton is by far the most important, accounting for 47% of total fibre, or

86% of natural fibre production in 1983. Wool accounts for 5% of all fibres and 10% of natural fibres. The balances are made up by flax and silk .

6.3.3 During the 1970s improved appearance and performance characteristics and a substantial reduction in prices enabled the synthetic fibres to make major inroads into the market, displacing natural fibres from the home furnishing and industrial textile markets and then from the apparel sector. The marketing effort for wool was evidently inadequate to meet this challenge. If costs associated with the production of natural fibres were to remain more stable, the competitive advantage and incentive to convert to synthetics would decline. Cotton, in particular, would benefit, although changes in the processing and end-use properties of the competing synthetic fibres will also be a significant factor.

6.3.4 A further factor in the decline in natural fibre consumption during the 1970s was the rapid growth of export orientated textile industries based on low-cost synthetic fibres and low-cost labour in a number of newly industrialised and other middle-income countries on the Western Pacific Seaboard and elsewhere. The resultant competition with traditional textile industries in the developed importing countries led to the introduction of protectionist measures, and eventually the GATT Multi-Fibres Arrangement which allows the industrialised countries to limit imports to market growth.

6.3.5 Overall therefore, as a result of a deterioration in the competitive position of synthetics, the outlook for total natural fibre consumption is for a somewhat faster growth than the 1.3% of the 1970s. Since production of wool is relatively unresponsive to price, a stronger market is likely to be reflected in increased prices rather than increased supplies of this particular fibre. At a projected global rate of increase of natural fibre production of 1.5% per annum, per capita consumption of natural fibres will decline from an estimated 5.25 Kg per capita in 1979–81 to 4.9 Kg per capita by 2000.*

6.3.6 While world production of cotton has been increasing, wool production has remained fairly static over the last 20 years at 1.5 to 1.6 million tonnes of clean wool per annum. As a consequence, wool's share of the total fibre market has fallen from 9% in 1952 to about 5% during the 1980s and is likely to fall still further to less than 4% before 2000. This is based on the expectation that world wool production will increase, on average, by less than 1% per annum over the period to 2000. (New Zealand's rate of increase is estimated at approximately 1.5% per annum.) However, within this longer-term trend there are likely to be significant differences between market trends for apparel wools and market trends for the non-apparel type wools which dominate New Zealand's production. The prospects and prices for wool will be determined first by trends in overall fibre demand but secondly, and more pertinently, by its competitive performance in each segment of the market vis-a-vis its competitors.

* Estimates made by Economic Perspectives Inc., Oct 1983

6.4 Future Rese Needs

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* See Infogram 6- latter exclude U

6.4 Future Research and Development Needs

6.4.1 Over the past 30 years, there has been a major shift in the end uses of New Zealand wool. Whereas in the 1950s the bulk of the clip was consumed in woven woollen and worsted cloth for apparel, carpets now account for an estimated 55% of all end uses in all markets*. This change coincided with a coarsening of the clip as farmers found improved profitability in selecting for fleece weight rather than fibre fineness. In effect, all the growth in New Zealand wool production over the past 30 years has been absorbed into carpets, while simultaneously other traditional end uses have declined outright.

6.4.2 In planning for the future, major emphasis must, therefore, be given to the continued development of carpet markets, matched by support for further improvement in carpet manufacturing technology. In addition, other end uses must continue to be developed. Product life-cycles are becoming shorter. In the woollen sector, consumption has been lost in the bedding market, although some successes have been recorded in the use of wool fills in duvets and other non-traditional products. Heavy woollen cloth for outerwear is also in danger of decline, and unless styling and finishing technology are developed, there is a real danger that the viability of processing techniques in the heavy woollen industry will be threatened.

6.4.3 Only a small proportion of New Zealand wool is ideally suited for apparel products. To make greater use of coarser wools in this end use will require continuing research into both yarn and fabric technology.

6.4.4 The local development of processing technology is important, especially as the IWS research effort has been shifted to technology transfer. This will demand additional research resources as well as the skills-training and education programmes necessary to apply and maintain the research effort in practice. The local scouring, processing, and manufacturing industries are growth areas, being internationally competitive and equipped with well-developed technology. Their continued growth will, however, require an on-going research effort, with effective technology transfer and innovative developments.

6.4.5 As the world's dominant coarse wool producer, New Zealand must take the initiative in the research and development of its products. International manufacturers have neither the resources nor the particular interest in New Zealand wools *per se* to take the lead. With wool research winding down in several countries, and with limited spin-off benefit from Australian and South African fine wool research, New Zealand is largely working by and for itself in coarse wool technological development.

6.4.6 The accurate specification of wool in manufacturing terms relevant to the processor—so that processing and product performance can be predicted—is of crucial importance to the industry. With-

* See Infogram 6-III. Carpets were 60% of New Zealand wool's end uses across 20 main IWS countries. The latter exclude USSR and China which use a lower proportion of NZ wool purchases for carpets.

out such 'objective measurement' wool's ability to compete effectively against other alternative fibres (which are comprehensively specified) will be curtailed. A priority is to ensure that adequate resources are directed to both the research, development and extension areas to ensure that the industry maximises the benefits available through objective measurement and specification.

6.4.7 The quality aspects of wool production have received relatively little research attention. Wool's quality is amenable to improvement by appropriate husbandry and clip preparation practices and, in the longer term, by improved breeding—greatly influencing producer returns. Additional effort in the area of education and training will be critical to maximise the advantages of better fibre specification. Producers will only follow the appropriate practices if they are fully conversant with the meaning and significance of the various measurements comprising the specification.

6.5 Marketing

6.5.1 New Zealand is a major shareholder in the International Wool Secretariat (IWS). The other Southern Hemisphere wool-growing countries in the partnership produce wool clips largely complementary to New Zealand's. IWS works to maximise the long-term financial returns of the wool-growers in its member countries. The combined production of IWS member countries accounts for 80% of all wool traded internationally. IWS services markets in 60 countries, providing market support from early stage processing assistance to demand-building consumer promotion.

6.5.2 More than 50% of the IWS budget is spent on direct international promotion to the consumer of wool product benefits and availability. This promotion uses the Woolmark trademark as its focus. Consumer research has shown clearly that product performance, aesthetics and price are more important than fibre, or where the fibre comes from, in a consumer's purchase decision.

6.5.3 In 1983/84, New Zealand woolgrowers contributed NZ$44 million to IWS. As a consequence of a substantial reduction in the New Zealand Wool Board's funds reserved for promotion and research, 1984/85 IWS funding has had to be reduced and IWS-sponsored marketing activities for New Zealand wool overseas will be at a much lower real level than previously.

6.5.4 The marked increase in the production of New Zealand crossbred wool in recent years prompted the direct initiation by the New Zealand Wool Board of its own international marketing programmes aimed at the creation of new primary processing markets to absorb the increased production. These programmes are targeted at countries with developing textile industries and at key markets for New Zealand wools within selected Western developed countries. The programmes are complementary to those of IWS.

6.5.5 Within New Zealand, the Wool Board fulfils the role of IWS in promoting wool products to the consumer and providing technical assistance to the textile industry. New Zealanders consume over 10 million kilograms of wool per annum and are the world's largest consumers on a per capita basis. Growth opportunities

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6.6 Prospects

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* Estimates made
† In 20 Main IWS

within the domestic market for the New Zealand wool textile industry are therefore limited.

The New Zealand Wool Board also operates a sizeable marketing operation for wool carpets in Australia.

6.5.6 New Zealand wool-grower resources are utilised for processing research and product development via the Wool Research Organisation of New Zealand (WRONZ) and IWS. This research is coordinated to meet the needs of fibre processors and consumers.

WRONZ is funded by the Wool Board, the Government, and textile and scouring industries. In recent years, government funding has represented a declining share of the budget and the Wool Board currently provides over 50% of total funds.

6.5.7 Overseas development (by machinery manufacturers) of textile machinery for coarse wool products is declining. Wool interests must develop their own new wool-specific technology.

6.5.8 Carpet product development is largely undertaken by IWS. Within New Zealand, a Wool Board/WRONZ product development programme focuses on bedding and upholstery and other new wool end uses.

6.6 Prospects for New Zealand Wool

6.6.1 Although New Zealand's share of total world clean wool production is currently 17%, its share of coarse wool (i.e. greater than 27.5 microns diameter) is approximately 36%. By the year 2000, these proportions will have become 19% and 38% respectively as a result of an anticipated 32% increase in the New Zealand clip from 279,000 tonnes (clean) in 1980 to 367,000 tonnes (clean) by 2000 and relatively stable levels of production in other countries and for other types of wool*. It has been estimated by the New Zealand Wool Board (see Infogram 6-III) that in 1980/81, 60% of New Zealand wool was used for carpet manufacture, 19% for knitwear and other apparel, 7% for hand-knitting yarn, and 14% for other home textile products†.

6.6.2 The longer-term prospects and markets for New Zealand wool are also likely to be influenced by the occurrence, or non-occurrence of certain specific market developments. These include:

(i) The continuation of relatively high rates of growth of fibre consumption at the end product level in some countries and particularly in the centrally-planned economies.

(ii) The continuing decline in the relative importance of the textile industry as a whole in traditional areas such as Western Europe and North America.

(iii) The probability that, notwithstanding any shifts in the location of the textile industry away from the industrialised countries, the final consumption of textiles will continue to be largely in Western Europe, North America and Japan.

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* Estimates made in Schroder, W.R. *The Long-term Future for New Zealand Wool.* (See Ref. 18)
† In 20 Main IWS Countries

(iv) The validity of the argument that of all wool end uses, carpets appear to offer the best growth prospects. It is claimed that in carpet-making, wool has its best chance of withstanding competition from synthetics; and it is in the production of carpet wools that New Zealand has a capacity to increase its present specialised production.

6.6.3 If recent trends are set in the context of anticipated economic and demographic conditions, it is possible to construct a 'crude gap' analysis, using constant price and policy assumptions, as a basis for subsequently developing a more realistic set of marketing objectives and strategies. The most important market over the last five years has been Japan, taking 11.1% of New Zealand's exports. New Zealand has accounted for 13.1% of Japanese import requirements over the same period. Although the rate of increase of Japanese consumption of fibres generally may be slowing down, wool consumption appears to be recovering following a substantial drop over the period 1980/1982. Imports by USA have been declining dramatically since the 1960s, and, despite a recent upturn, account for only 2.8% of world imports, including 3.5% of New Zealand exports. However, total fibre consumption is expected to increase both in USA and Canada over the next 15 years, and the extent to which wool will share in this market growth will be determined very largely by the efficiency of marketing programmes. The IWS (1983) anticipates an increase in US wool consumption of 3–4% per annum.

6.6.4 As can be seen from Infogram 6-V, Western Europe is still a significant importer of wool with Belgium, France, Italy, West Germany and United Kingdom, between them accounting for 41% of world imports over the period 1977/81 and almost the same proportion of total New Zealand exports. It has been argued that in Western Europe rapid structural adjustment and technological change are making the industry more competitive, particularly for carpets and fashion apparel where it is well placed to exploit the aesthetic value of wool in a 'fashion' sense. However, it is not clear whether this trend is likely to lead to an increase in wool's share of the fibre market in these countries, or to an increase in Western Europe's share of the world textile manufacturing sector. More dynamic economic growth, expected in some of the southern European countries such as Portugal, Spain, Greece and Turkey, could be expected to result in more rapid increases in total fibre and wool requirements.

6.6.5 After Japan, the USSR is the world's largest importer of wool and in recent years has increased its share of both total world imports and New Zealand wool exports to about 11%. The expansion of textile production and wool imports in both Eastern Europe and the USSR has been essentially for domestic consumption rather than as a basis for export textile industries. This trend is likely to continue with USSR and in particular other East European countries showing growth in wool consumption and in overall fibre consumption.

6.6.6 The other major centrally planned economy, China, has given a high priority to the development of its textile industry which, as a consequence, has been expanding its output (in value terms) at

Infogram 6-V

Major World Importers of Wool (Actual Weight)

Rank	Country	MKg Average 1977/81	% of Total
1.	Japan	194.5	16.9
2.	USSR	125.5	10.9
3.	UK	122.0	10.6
4.	France	120.4	10.4
5.	Italy	105.3	9.1
6.	W. Germany	79.2	6.9
7.	Belgium	45.7	4.0
8.	USA	31.9	2.8
9.	Taiwan	23.2	2.0
10.	Korea	23.0	2.0
	Others	281.8	24.5
	TOTAL	1,152.5	100.0

over 18% per annum over the last five years. Export earnings from textile yarn, fabric and clothing also increased rapidly and in 1981 amounted to $US5,446.5 million, almost 25% of the value of all commodity exports. Although China is the world's fifth largest producer of wool, only 4% of garments exported in 1981 were of woollen goods (against 50% cotton, 35% polyester cotton and 10% silk). However, the Chinese appear anxious to boost the export of high-value woollen garments, as well as to satisfy domestic wool requirements and imports are projected to increase at over 5% per annum.

6.6.7 New Zealand is well placed to take advantage of China's expanding demand for wool. It has maintained its share of the Chinese market at around 50% (excluding sliver and top imports) and produces a type of wool well suited to Chinese requirements. China has a large and growing demand for hand-knitting yarn which consumes some 60–65% of New Zealand wool exports to China. Up to 25% is used in the manufacture of blankets—the fastest growing area of wool use. There is a small but developing machine-made carpet industry in China. The bulk of Chinese carpets are hand-knotted and produced from domestic wools. Imports of carpet wools from New Zealand have fluctuated at around 10% of total wool imports which amounted to 47,500 tonnes in 1981/82. In general, New Zealand wool exports to China are used for domestic consumption rather than for re-export in further processed form.

6.6.8 Other developing countries, including Egypt, India, Iran, Iraq, Pakistan and Saudi Arabia, are all showing rapid development of demand for fibres generally and wool in particular. Although the relevant production and consumption statistics are of variable quality, it would seem that carpets are the predominant end use for New Zealand wool and this demand is likely to continue to expand. In some markets, e.g. Hong Kong, yarn is an important element in trade. Improving its knowledge of these markets should clearly be a priority for the New Zealand industry.

6.6.9 The reduction in the proportion of world textile production manufactured in the developed industrialised countries, and the corresponding increase in the proportion produced in developing and Eastern Bloc countries, have important implications not only for trade flows, but also for marketing strategies. Expanded production in the developing countries and centrally planned economies has been partly absorbed in local consumption, the balance contributing to an increased flow of exports to the industrialised countries. From the point of view of a fibre producer such as New Zealand, shifts in the location of textile production to countries that are able to produce and export textiles of similar quality more cheaply, should be regarded favourably. So long as trade in textiles is not too distorted by protective measures, the result should be increased total fibre consumption because of lower cost to the final consumer. However, as Schroder[18] has pointed out, *"shifts in the location of wool textile production from 'traditional' wool users in Europe and Japan to developing countries requires a major marketing and technical service effort by wool suppliers to educate textile producers on the use of wool. Furthermore, if the quality of wool textile exports from developing countries is lower than that of the traditional suppliers, this would be damaging to wool's 'quality' image."*

6.6.10 Wool's position in the market could also be adversely affected by other factors as its marketing share, and hence its market presence, become eroded. For example, its research base and hence its capacity to sustain competitive technological development is likely to decline relative to other textiles. Lower real prices for wool and therefore lower wool-grower profitability could aggravate this trend. And the viability of wool production is likely to be strongly influenced by the strength and the evolution of demand for sheepmeats.

6.7 Added Value through Wool Processing

6.7.1 Considerable progress has already been made in the scouring of wool locally (the first step in adding value through extra processing), with 60% of the total clip now being scoured in New Zealand. This development has been based firmly on research, particularly that done at WRONZ, and the industry now produces a competitively priced, quality product.

6.7.2 Beyond scouring, progress has been slower, although 9% of total production is now processed domestically to the yarn stage. About 75% of this is further processed through to final product, mainly carpets. The profitability of such processing, from the country's viewpoint, is obscured by the existence of import protection and export incentives. Restructuring of the industry following a report by the Industrial Development Commission [33] in 1980, has led to rationalisation, modernisation and increased investment.

6.7.3 The recent growth in the scouring sector demonstrates that resources allocated to this area have produced a good return to New Zealand. Adding further value to New Zealand wool is likely to be most successful through a focus on the next stages in processing, particularly to the yarn stage. Developments already being undertaken at this stage indicate the potential for future growth and success.

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6.7.4 Manufacture of final product forms should be selectively encouraged so that production is clearly market led and is targeted at the top end of the market where the aesthetic and quality features, which can be incorporated easily into New Zealand wool-based products, will at least match price factors in consumer purchase decisions. Little progress is likely to be achieved if New Zealand manufacturers try to compete internationally on the basis of price alone in a textile environment where, increasingly, volume production of commodity products is based in low wage/cost countries against which New Zealand would find great difficulty in competing.

6.7.5 The competitive position of domestic producers over foreign suppliers of manufactured goods could be improved if research and development priorities are fulfilled. The industry would then be better positioned to to take advantage of emerging opportunities in international textile markets as they occur.

6.8 Conclusions

6.8.1 Just as a marketing strategy for sheepmeats needs to be established within the framework of evolving demand for animal protein foods, so a marketing strategy for wool must be developed within the framework of an expected development of demand for textile fibres. Although wool production can be predicted with reasonable accuracy, there is a need to establish a more comprehensive and systematic data base on which to predict longer-term trends in textile demand and textile production as a basis for determining priorities in both the market development and product development areas. Both are essential elements in a precisely targeted and appropriately funded marketing strategy.

6.8.2 It appears that in the future the wool industry's traditional role as a producer of an industrial raw material is likely to come under increasing pressure as demand focuses on wool as a 'branded' or at least 'warrantied' intermediate product, sold on the basis of objective specification. This raises the question of whether the wool industry is about to embark on a transformation from primary producer to international textile industry, following the development path pioneered by the dairy industry. The answer to this question has important ramifications not only for the structure of the industry but also for the determination of market research and product development priorities.

6.8.3 This study has focused attention on a further point which appears to warrant more consideration—namely, the role of the sheep as a source of raw material both for the meat industry and for the wool and textile industries. With increasingly stringent product specification being required by both meat buyers and wool processors it is becoming increasingly unrealistic to suppose that each can be looked at in isolation and that each can be regarded as a by-product of the other. There is, we believe, at all levels of management, research and commerce, a need to reassess the national sheep flock as a source of raw material for both industries and to develop a common framework of policies and production strategies in which both end products are given appropriate weight.

Chapter 7 The Market Outlook and Export Growth Prospects for Selected Horticultural Products

7.1 General

7.1.1 In world terms, New Zealand is a very modest exporter of horticultural exports. Apart from apples, in which we are the world's tenth largest exporter, and kiwifruit in which we are the leading exporter, New Zealand is insignificant in world trade in fruits and vegetables.

7.1.2 In terms of New Zealand's export earnings, however, horticulture is not unimportant. At $262 million in 1983, it now contributes 3.4% of total export earnings, an increase from 1.8% ten years ago, and 1.1% 20 years ago. The rate of growth of horticultural exports has been good, though not spectacular, averaging 19% per annum for the past two decades, 6% faster than the rate of growth of total exports. (However Chile increased the US dollar value of its horticultural exports between 1970 and 1980 by 26% per annum!)

7.1.3 The rate of growth of kiwifruit earnings has been spectacular, averaging 67% growth per annum over the past decade; but even the kiwifruit success story needs to be kept in perspective. The contribution to total export earnings made last year by kiwifruit—both fresh and preserved—remains modest at 1.3%. Moreover, the annual rate of growth of export receipts for kiwifruit over the past five years (50%) is less than that for other fresh fruits outside of apples and pears (62%). It might be deduced from this that the most dynamic future growth in horticultural export earnings will be in new product areas. However, this does not necessarily follow, because these spectacular rates of growth are related to very low base figures.

7.2 Market Prospects: A 1984 Assessment

7.2.1 It is not possible to use the same approach for assessing the market prospects for horticultural exports as has been used for livestock products. UN statistics provide the basis for a trade and market share analysis for eight fruit commodities, of which only one (apples) is of export importance to New Zealand. Moreover, the FAO data and elasticity coefficients on which the demand projections for the meat and milk analyses were developed are not sufficiently detailed to allow the same analytical framework to be used for specific horticultural commodities. Sufficiently specific information is not available even for apples.

7.2.2 For a number of reasons, including differences in seasonality of demand, differences in the degree of substitutability between products and differences in the characteristics of demand for products at different stages in their market life-cyle, the 'broad brush' approach used to make an initial screening of markets for livestock products is less appropriate for horticultural products. An attempt has been made to develop a provisional introductory analysis of market prospects based on aggregate demand projections for fruits and vegetables and demand projections for a sub-group, 'other fruits'. However, this is an area in which a great deal of further work will be required in order to establish a satisfactory base for forecasting market trends and for identifying emerging prospective growth markets.

7.2.3 On the basis of the information available, including the analyses pre-

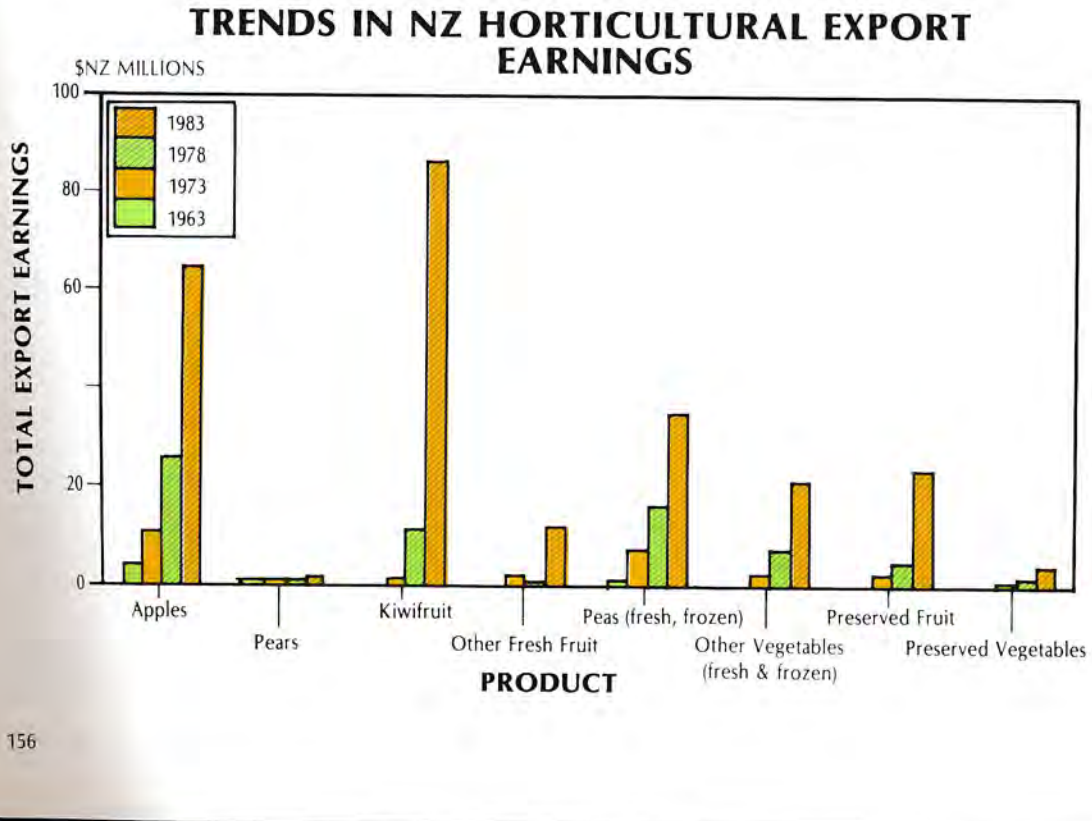
sented in Chapters 1 and 2, market prospects have been analysed in respect of:

(a) apples
(b) pears
(c) kiwifruit
(d) other fruit
(e) processed fruits
(f) ornamentals

The growing contribution of the horticultural sector to export earnings is summarised in Infogram 7-I.

7.2.4 Lack of detailed statistical information on supply and demand for specific horticultural products entering international trade, limits the accuracy and therefore the usefulness of assessments of market prospects for particular commodities. Moreover, most horticultural products need to be marketed fresh during a limited period of time, are produced at a different time of year in the Southern and Northern Hemispheres, and each product, sometimes each variety, has a different and specific market. As a consequence, the information on which to base, let alone build, a market development strategy for horticultural products tends to be more complex, more fragmented and therefore more difficult and more expensive to collect and analyse than is the case for the more traditional livestock products. While it is reasonable to assume that demand for horticultural products *in general* will respond to the same forces, analysed in Chapter 1, as livestock pro-

Infogram 7–I



ducts, and growth in market opportunities can be expected in the same countries and regions, the same cannot be said in respect of *individual* horticultural products. At the individual product level the identification of potential markets and the formulation of marketing strategies which will best exploit market opportunities are much more specific to the particular product, the particular market and the particular time. Nevertheless, a key element is still the quality and the extent of the market information on which entrepreneurial decisions are to be based. The approach advocated in this study is intended not to temper entrepreneurial instinct or activity, but to provide a better base for decisions.

7.2.5 For the reasons given in paragraph 7.2.2, the 'crude gap' approach, adopted in this study for analysing trends in the markets for livestock products, is not really appropriate for horticultural products, particularly in view of the data deficiencies. Unfortunately time and resource limitations have prevented the development, even on an illustrative basis, of a more suitable alternative methodology. Such an exercise should be accorded priority in any follow-up to this study, together with the establishment of an effective data base to allow for systematic and on-going monitoring of horticultural products, as a basis for development planning.

7.2.6 When world over-supply of a particular fruit occurs, not only does the fresh fruit value fall, but the processed products manufactured from that fruit also become subject to more intense competition. World forecasts of orange and apple production indicate the probability of gross over-supply of both apple and orange concentrates by the 1990s. As a consequence, world prices can be expected to fall to below cost of production levels. Markets for berryfruits have proved to be particularly erratic and difficult to predict. For countries such as New Zealand, the viability of such crops could depend to a very large extent on the development of markets for value-added processed foodstuffs whose profit is derived not from the concentrate, but from the manufacture of products made from the concentrate.

7.2.7 Kiwifruit will be in a slightly different situation. Although over-supply of the fruit is unlikely in the near future, markets for processed products are being actively sought and developed. Significant research and development resources are already being channelled into this area.

7.3 Apples

7.3.1 Although New Zealand produces only 0.7% of the world's production, it has a 2.8% share of trade (1981 year), being the tenth largest exporter. Only three of the larger exporters—Argentina with 7%, and Chile and South Africa with 5% each—supply from the Southern Hemisphere, and these, given the seasonality factor in apple production, have been New Zealand's most significant direct competitors.

7.3.2 Until recently, apples have been the mainstay of New Zealand's horticultural export trade. Only five years ago, they accounted for two-thirds of fresh fruit export receipts and one-third of total horticultural export receipts. The major

export markets have been the EEC, Britain, USA, Singapore and Hong Kong.

7.3.3 Although export receipts have continued to increase each year since 1978, the volume exported declined in 1982 and again in 1983, being 8% down from the peak of 1981. This decline has been attributed to adverse climatic conditions in 1982 and 1983 seasons which temporarily halted the upward trend in exports. The 1984 season export figures have continued the original trend with exports 28% above the 1981 quantity. However, there is also a need to know to what extent changing patterns of demand, increased competition from domestic or other foreign suppliers or changing transportation and storage technology and costs are likely to affect future prospects in specific markets.

7.3.4 Infogram 7-II summarises a market outlook assessment based on OECD studies. However, these projections extend only to 1988, and their supporting data do not allow calculation of longer-term projections out to 2000. Moreover, the projections are limited to the OECD countries and are therefore incomplete in global coverage, constituting only 45% of global production and 61% of world exports in 1981. They should therefore be regarded as part of a short-term market outlook assessment. They are thus not strictly comparable with the 'crude gap' projections used as a basis for evaluating prospects for meat and milk products.

7.3.5 There is a further problem in applying the methodology used in assessing prospects for livestock products. Because of the seasonality of production and in some instances demand, the opportunity for New Zealand to exploit Northern Hemisphere markets is restricted to the short period during which New Zealand product can be sold 'fresh'. Therefore apparent import market size can be somewhat misleading as a basis for assessing New Zealand marketing prospects. Nevertheless, at this stage and despite its shortcomings, the information analysed represents the most comprehensive data on apples available in New Zealand and from international agencies.

7.3.6 The OECD figures* suggest that the best short-term market prospects are likely to be in four West European countries—West Germany, Spain, Italy, and Britain. While Germany is a large import market, it is mainly supplied from European countries and New Zealand has only a very small share. However its projected growth in net import demand over the decade to 1988 is the second highest of all OECD countries after Spain. The projected growth in net import demand in Italy is the third largest in the OECD. New Zealand has had no share until recently, but from 1984 will have access to this market for part of the marketing season. The United Kingdom constitutes a large market which also is projected to show a sizeable growth in net import demand. In West Europe, there exist no formal quantitative restrictions on fruit imports, with

* It should be noted that the OECD report relies heavily on information from the member states which may overestimate the effectiveness of production control measures. The report's estimates of net import demand particularly for the West European countries, are therefore likely to be overstated.

Infogram 7-II

Production, N

EEC 10
Production
Net Trade
Consumptio

South Europe
Production
Net Trade
Consumptio

Other Europe
Production
Net Trade
Consumptio

North Ameri
Production
Net Trade
Consumpti

Japan
Production
Net Trade
Consumpti

South Hemis
Production
Net Trade
Consumpti

[1] Portugal, Spain
[2] Finland, Norwa
[3] Canada, U.S.A.
[4] Australia, New

Infogram 7–II

Production, Net Trade and Consumption of Apples

[Imports (+), Exports (−)] '000 Tonnes

	Average 1977/80	Forecasts 1985 or 1985/86		Forecasts 1987 or 1987/88	
		Minimum	Maximum	Minimum	Maximum
EEC 10					
Production	6 653	6 155	7 099	6 231	7 171
Net Trade	+243	+278	+148	+373	+243
Consumption	5 674	5 732	6 434	5 751	6 453
South European Countries[1]					
Production	2 676	3 030	3 280	3 185	3 425
Net Trade	−46	−94	−81	−102	−84
Consumption	2 588	2 880	3 125	3 025	3 265
Other European Countries[2]					
Production	591	530	643	531	662
Net Trade	+203	+190	+197	+191	+198
Consumption	752	661	798	665	806
North American Countries[3]					
Production	3 986	4 716	5 350	4 800	5 675
Net Trade	−139	−69	−464	−107	−548
Consumption	3 686	4 625	4 852	4 669	5 089
Japan					
Production	904	1 000	1 000	1 040	1 040
Net Trade	+6	−5	−5	−5	−5
Consumption	910	995	995	1 035	1 035
South Hemisphere Countries[4]					
Production	483	560	705	626	763
Net Trade	−129	−170	−204	−216	−250
Consumption	354	390	501	404	515

[1] Portugal, Spain, Turkey, Yugoslavia
[2] Finland, Norway, Sweden, Austria, Switzerland
[3] Canada, U.S.A.
[4] Australia, New Zealand

Source: OECD: 1983 [Ref 34]

the exception that apples are subject to voluntary restraints in times of high domestic production.

7.3.7 The OECD figures indicate a positive trend in net import demand for the future EEC of 12 (413,000 tonnes by 1988 excluding intra-community trade). This suggests good prospects for import growth but there are other developments which signal the need for caution and careful appraisal of New Zealand's future role in these markets. Technological developments are whittling away New Zealand's 'out of season' advantage and, more ominously, the EEC has been expecting increasing surpluses in domestic production to the extent that for some years it has been paying grants for the elimination of older trees and orchards in order to limit production increases. Much depends on the effectiveness of these policies.

7.3.8 Another ostensibly good export market prospect is Saudi Arabia. New Zealand had no share in this sizeable market until 1980 but in the past two years has secured a valuable foothold, the 1983 export tonnage representing 9% of total 1980 Saudi imports*. Iran and Kuwait and two North African markets, Egypt and Libya, are showing strong growth and significant dependence on imports which may lead to opportunties for New Zealand in the future.

7.3.9 Other likely markets are the neighbouring Western Pacific Seaboard countries, particularly Malaysia, Singapore, and Hong Kong, where demand for apples is growing in line with increasing affluence, where import dependence is increasing and where New Zealand is well placed to expand its market share.

7.3.10 Four South American markets—Brazil, Columbia, Venezuela and Peru—are all showing strong growth and increasing import dependency. Due to their proximity to two major competitors, Argentina and Chile, market access problems, logistics of supply and low prices, these markets have not been penetrated to any extent by New Zealand. Nevertheless, they, and in particular Peru, appear to warrant future consideration.

7.3.11 The two North American markets are both large, and open to New Zealand subject only to phytosanitary regulations. New Zealand has a good market share during its marketing season in these countries but the negative trend in net import demand to 1988, particularly in the USA, suggests that there will be some pressure on foreign supplies from local producers.

7.3.12 On balance, market prospects for apples appear reasonably good outside the OECD area. However, within the OECD, increasing supplies and sluggish demand are likely to bring greater marketing difficulties in some traditional markets notably in Europe and North America.

7.3.13 New Zealand is in competition not only with Argentina, Chile, Australia and South Africa, but also increasingly with

* Figures for Saudi Arabian imports in 1983 are not yet available.

those Northern Hemisphere suppliers whose negative trends in import demand are causing problems for their own hemispheric competitors (France, Belgium, Netherlands, Austria, USA and Turkey).

7.3.14 Except for Australia (whose projected supply and demand virtually break even), no projections are available for the Southern Hemisphere countries. New Zealand projections indicate a sizeable growth in production over consumption and thus a substantial export capacity in apples.

7.3.15 New Zealand's apple trade has defied various pessimistic prognostications, averaging an annual growth of 3.7% over the past four years. Much of this success is due to the uniform quality of fruit and consistent grading standards which the apple industry has maintained, together with a continuing ability to adapt to changes in varietal preferences. Despite developments in storage technology, consumers have retained a preference for 'fresh' as opposed to 'stored' fruit. New Zealand has been able to exploit its quality image in order to obtain a premium which has enabled it to hold its own with southern competition from South Africa and Chile, notwithstanding the earlier seasons and closer proximity to northern markets which give these countries a significant advantage. However, the main New Zealand export species, Granny Smith and Red Delicious, which comprise two-thirds of exports are already coming under pressure, and this is likely to increase over the next ten years as quality improvement in competitors' products continues. The need, then, is to maintain an intensive breeding research activity, oriented toward the development of new varieties, with emphasis, in both production and marketing, on product quality. Further market research is needed into trends in consumer preferences in specific overseas markets, taking into account both trends in methods of utilisation and trends in buying patterns, home storage etc. Information on consumer preference in North America, China and Japan suggests that the ideal qualities are sweet taste, good texture, high juice content, reasonable size, and flawless appearance. The North American and European markets, especially the youth, exhibit conservative tastes (an easily chewed apple with a bland taste). An attempt might also be made to bring forward the season through variety developments so as to compete more aggressively with southern competitors and thus exploit more fully the northern market. A variety that ripens before February, when the early varieties, Gala and Cox's Orange, ripen, would significantly strengthen New Zealand's marketing position.

7.3.16 In the longer term, however, New Zealand can expect increasing competition, and increasing difficulty in holding its current market share in Europe. Production in this region is already in excess of consumption, and New Zealand's 'complementary season' advantage is gradually disappearing as storage techniques develop and as varieties are introduced to capitalise on this new technology.

7.3.17 In these circumstances, market development constitutes no easy challenge. In the past, a serious breeding programme has involved up to a 20-year

period—ten years' research and development and ten years' commercial propagation—before a new variety could be proven for export. The lead-time has now been shortened as a result of the introduction of new techniques, but it is still a matter of years, not months. An intensive land and labour contribution is also required: the current apple breeding programme, for example, has involved an initial planting of 40,000 hybridised seedlings which were successively thinned out through disease and yield selection, to 100 trees with desired growth and fruit characteristics, from which six were selected for commercial propagation. With a lengthy lead-time, accurate market assessments and forecasts, together with an industry commitment, are critical to success. Effective co-ordination between trade and marketing people and research technicians, and between commercial and scientific institutions, is essential.

7.3.18 There would seem to be considerable scope for further export market development for processed apple products. The recent introduction to the New Zealand domestic market, of retail beverage packs, using imported citrus and sub-tropical juices mixed with an apple juice base and attractively presented in disposable 'tetrabrik' cartons, has pointed up the possibilities in this area either through the direct supply of retail packs to proximate Asian, American and Pacific markets or through off-shore ventures of the kind pursued by the Dairy Board. To date, exports of apple juice have been mainly confined to bulk supplies of concentrate, primarily to the USA and Australia for beverage manufacture and as an addition to can syrups.

7.4 Pears

7.4.1 Partly because of the existence of a statutory board designated 'The New Zealand Apple and Pear Marketing Board', the export trade in pears has a rather higher profile in New Zealand than is warranted by actual export volumes and earnings. Even 20 years ago, pears accounted for only 4% of fruit and vegetable export earnings; in 1983, a mere 0.5%. Yet this is not to say that export opportunities are non-existent. World trade in pears is not small at 698,000 tonnes (1981), but New Zealand has a minute share of it (0.3%). It is worth examining where the large import markets are, and what growth prospects exist.

7.4.2 The information available on pears is more meagre than that on apples, which makes the development of a comprehensive set of data within a global framework difficult, if not impossible, at this juncture. In similar manner to apples, a set of OECD supply and demand projections for the period 1977/78 to 1987/88 is available, and this information is summarised in Infogram 7-III.

7.4.3 It is clear that there exist large and expanding import markets for pears and, it would seem, *prima facie*, considerable opportunity for expansion of exports by New Zealand. Exports of 2.409 MT (1981) are currently confined to the European Community, USA, Hong Kong, and the Pacific Island countries. Although 61% of New Zealand exports go to the EEC, we have a minuscule share (0.4%) of this market, and we know the final destination of only one-seventh of this trade. Hong Kong is the third largest import market in the world and is relatively close, yet New

Infogram 7-III

Production, N

EEC 10
Production
Net Trade
Consumptio

South Europea
Production
Net Trade
Consumptio

Other Europe
Production
Net Trade
Consumptio

North Americ
Production
Net Trade
Consumptio

Japan
Production
Net Trade
Consumptio

South Hemisp
Production
Net Trade
Consumptio

[1] Portugal, Spain,
[2] Finland, Norway
[3] Canada, U.S.A.
[4] Australia, New Z

Infogram 7–III

Production, Net Trade and Consumption of Pears

[Imports (+), Exports (−)] '000 Tonnes

	Average 1977/80	Forecasts 1985 or 1985/86		Forecasts 1987 or 1987/88	
		Minimum	Maximum	Minimum	Maximum
EEC 10					
Production	2 227	2 090	2 193	2 099	2 352
Net Trade	+15	−2	−4	–	−2
Consumption	1 911	1 886	2 112	1 879	2 105
South European Countries[1]					
Production	834	927	1 032	955	1 045
Net Trade	+2	–	–	–	–
Consumption	825	910	1 007	940	1 022
Other European Countries[2]					
Production	111	105	129	104	128
Net Trade	+63	+48	+69	+50	+71
Consumption	160	147	185	143	186
North American Countries[3]					
Production	772	879	965	896	1 021
Net Trade	−10	−3	−27	−2	−29
Consumption	723	874	936	892	990
Japan					
Production	510	570	570	590	590
Net Trade	+1	−2	−2	−2	−2
Consumption	510	568	568	588	588
South Hemisphere Countries[4]					
Production	145	114	163	114	164
Net Trade	−34	−27	−38	−27	−39
Consumption	105	102	121	102	121

[1] Portugal, Spain, Turkey, Yugoslavia
[2] Finland, Norway, Sweden, Austria, Switzerland
[3] Canada, U.S.A.
[4] Australia, New Zealand

Source: OECD: 1983 [Ref 34]

Zealand has only 0.2% of the market share. Good growth prospects are apparent in other Pacific Basin markets, such as Singapore, Malaysia, Canada and the United States. Of these New Zealand currently sells only to the United States, where it has 1% of the market. The United States, although a small import market, appears to show a positive trend in the crude gap, and this requires further investigation. The Canadian market, currently larger than that of the U.S.A., is also showing a positive trend in crude gap, albeit of lesser magnitude. Other possible growth markets for pears might be Spain, Saudi Arabia, and perhaps Venezuela and Brazil. There are no quantitative restrictions on the pear trade, the only constraint being the phytosanitary regulations applied in certain countries.

7.4.4 In general, there would appear to be good opportunities for New Zealand to expand pear exports, provided the cost of producing pears can be reduced to a level nearer to that which applies to apples. Although information on competitors' market shares of specific import markets is not readily available, it is of importance to identify other major pear exporters. The main Southern Hemisphere exporters are South Africa (7% share of world trade), Argentina and Australia (5% each), Chile (3%) and Uruguay (0.5%), compared with New Zealand's 0.3%. There are 18 large Northern Hemisphere exporters, the largest being Italy (20%), France (13%), China (9%) and USA (8%).

7.4.5 The fact that New Zealand's export pear trade has decreased in volume by 3.6% annually over the past ten years is due to several factors. The considerable height and size of pear trees means a relatively labour-intensive, and therefore costly, New Zealand industry. Moreover, the lack of attention to pear cultivation over many decades has resulted in poor pre-conditioning and inferior appearance of the product. However, there is some confidence within the scientific establishment that these defects can be remedied and that a product of better appearance, that does not require pre-ripening, can be developed. It is also believed that earlier research problems in developing dwarf trees could be overcome.

7.4.6 It is understood that high priority in research and breeding programmes is being given to pears, ahead even of new apple varieties. It is not clear, however, that the market research to justify such efforts has been adequately detailed or sufficiently comprehensive, particularly in view of the changes in the character of import markets which are likely to have a major impact on export prospects for traditional pip-fruit.

7.5 Pyrus Serotina (Nashi or Asian Pears or Oriental Pears*)

7.5.1 *"The nashi, or oriental pear (*Pyrus serotina*) is a pip fruit which essentially has*

* There is currently some debate over whether the appropriate English name for this fruit is 'nashi' or 'Asian pear' or 'oriental pear'. In Japan, the major market, the fruit is called 'nashi' and it has been given this name in publications by the Department of Scientific and Industrial Research, including *Prospects for Horticulture: A Research Viewpoint* by E.G. Bollard, then Director of the DSIR Division of Horticulture and Processing, from which the following paragraph has been quoted.

*not been tried in New Zealand. It is closely related to the ordinary pear (*Pyrus communis*), but quite distinct from it. Nashi is a traditional fruit of parts of Asia and is a major fruit in Japan. On the evidence of the few trees already planted in New Zealand it seems likely that this crop would grow and produce well here, and the possibilities of developing it as a major new export crop have aroused a lot of interest. No export to Japan can be contemplated until the codling moth problem is solved by fumigation or other procedures, but there are possibilities of other markets in Hawaii, California and some Asian countries. In general, the fruit does not store as well as ordinary pears, and our out-of-northern-season production would give us more than the usual advantage with respect to that hemisphere."*

7.5.2 Considerable interest in this fruit is currently being shown by both the production and export sectors as a potential horticultural export crop. At present production is concentrated in Japan, which hitherto has supplied its own luxury market and exported the fruit only to Hong Kong and Singapore in small quantities. There is some speculation that the Northern Hemisphere luxury markets of North America and West Europe offer considerable potential export opportunities. It is significant that plantings have commenced in USA, and New Zealand would be well placed to provide off-season supply. Initial indications are that there are no production problems in New Zealand, that the fruit should do well particularly in areas from Tauranga to Nelson, since it requires some winter chilling. A ten-year breeding programme aimed at improving colour and flavour of the existing strain through hybridisation is commencing now in New Zealand. While such a commitment of resources at this stage appears to be justified, it will need to be complemented by a corresponding investment in more comprehensive market research before the project enters into the commercial development phase.

7.6 Kiwifruit

7.6.1 New Zealand is pre-eminent in kiwifruit production, the fruit having originated in China and having been brought to New Zealand during this century. Production in New Zealand did not really start to expand, however, until the late 1960s and early 1970s. By 1981, New Zealand accounted for 58% of the world's commercial kiwifruit planted area, ahead of the USA (14%), Italy (11%), France and Japan (6% each), and eight other countries.

7.6.2 Over the past 14 years, fresh kiwifruit exports have increased by 37% per annum by volume, and by 55% per annum in value. The real f.o.b. export price of kiwifruit per tonne in 1982 was less than in 1970, having dropped from the peak years 1977–1979. Kiwifruit's contribution to total export earnings increased from a tiny 0.01% to a significant 1.2%, mainly because of the expansion in export volume but also because of a price improvement relative to our other export commodities. Given constant real prices overseas, it seems that the main reason for the sustained increase in investment in kiwifruit production was the growing appreciation of the longer-term potential of this new product. A secondary factor may have been the decline in real earnings from other agricultural enterprises in

the late 1970s and early 1980s. The initial development of kiwifruit exports during the 1970s was the result of the emergence of the right product at the right time. However, the genuinely unique qualities of kiwifruit in both content and appearance, were complemented by the early formulation of a determined marketing strategy helped by a coherent industry structure and sustained investment in market research. The continuing success of the kiwifruit venture owes much to the unique combination of the entrepreneurship and coordinated market research and development which are features of the industry today.

7.6.3 There has been considerable debate concerning future prospects for kiwifruit. The intention in the present context is to attempt to establish a factual base, on which an objective assessment of future market prospects can be built.

7.6.4 International production and trade in kiwifruit is too small by global standards to warrant separate analysis by international food and trade agencies. We are therefore reliant on information from national sources. This is of two kinds: first, information pertaining to the production sector in the form of estimates of future kiwifruit plantings and production volumes available for export, and estimated financial, capital and labour requirements. Secondly, the results of market research into consumer behaviour and preferences in various foreign markets. However, data available at the present time is not sufficient to establish national supply and demand projections even in major consuming and producing countries.

7.6.5 Infogram 7-IV shows estimates of current plantings and production of kiwifruit in all major producing countries. The peak growth years in New Zealand export production are expected to be 1983 and 1984, with growth rates steadily declining thereafter, from 65% (1984) to 9% (1992) per annum. Export volumes are derived from planting estimates and incorporate implicit assumptions concerning government investment policies and tax regulations. The estimates which are based on constant real prices and constant policies—the same assumptions that underpin the projections for the major commodities in the previous sections—have been revised downwards since the government regulations affecting kiwifruit investment were altered in 1982*.

7.6.6 The New Zealand success has stimulated interest in producing the crop elsewhere and the effect of foreign suppliers on export prices is critical for the future. Infogram 7-IV shows the relative significance of competitors in 1981. The longer shelf-life of kiwifruit (compared with apples) results in a significant overlap with the northern crop at the latter end of New Zealand's export season (October-November). New Zealand is thus likely to be in competition with the larger northern suppliers as well as other Southern Hemisphere producers. Although New Zealand is currently the dominant

* The MAF estimate in April 1982 of equivalent export production for 1990 was 71.74 million trays, and its May 1983 estimate was 63.98 million trays, a downwards revision of 10.8%.

Infogram

Known

Northern
China
USA
Italy
France
Japan
Greece
Portugal
Israel
Spain

Souther
NZ
Australia
Chile
South A
Zimbabw

World

Sources: DF
M

producer, this
Production in
expected to gr
1981 to 17,000 t
crop, 2,250 ton
4,000 tonnes in
stock plants fr
$3.5 million o
mostly to Japan
the New Zealar
by 1990 produc
order of five ti

Infogram 7–IV

Known Information on Kiwifruit Competition

	1981			
	Plantings (hectares)	*Bearing (ha.)*	*Production (tonnes)*	*Exports (tonnes)*
Northern Hemisphere				
China			142,000	0
USA	1800	580	5,000	
Italy	1500		1,500	500 (1982)
France	1200	375	2,250(?)	2,112 (1982)
Japan	760		1,634	
Greece	200		258	
Portugal	50			
Israel	40		25	
Spain	30	80+		
	5,580			
Southern Hemisphere				
NZ	7583	1,019	22,375	17,900
Australia	150	75	200	55
Chile	160			2
South Africa	100			
Zimbabwe	30			
World	13,603		150,000–200,000	

Sources: DFC
MAF (1982)

producer, this is expected to change. Production in Japan, for example, was expected to grow from 1,000 tonnes in 1981 to 17,000 tonnes by 1985. The French crop, 2,250 tonnes in 1981, increased to 4,000 tonnes in 1982. Exports of kiwifruit stock plants from New Zealand totalled $3.5 million over the past five years, mostly to Japan. It has been estimated by the New Zealand Kiwifruit Authority that by 1990 production in Japan will be of the order of five times present production.

7.6.7 Real prices have so far remained surprisingly constant (see Infogram 7-V), but eventually, expanding production may take the product out of the limited high-priced luxury market into the broader-based middle-income market with an accompanying reduction in relative prices. This scenario suggests some erosion of real prices and the likelihood of a decline in profitability relative to other enterprises competing for the same productive resources. The effect of such develop-

ments on total export earnings is difficult to predict.

7.6.8 The kiwifruit sector differs from other sectors within the agricultural industry in that it has been blessed with a unique product, a monopoly position and an expanding market. The industry's objective has been to strengthen and consolidate New Zealand's market position during its period of market monopoly which is now disappearing. In developing its marketing strategy, the industry has made considerable use of market research techniques. Surveys have been conducted in a number of countries to obtain measures of consumer awareness and preferences for New Zealand kiwifruit relative to competing products. In major markets, supplementary trade research has been commissioned to measure the extent of retail distribution of the New Zealand product, and in-depth trade research is undertaken to elicit retailer, wholesaler and importer attitudes towards New Zealand and locally-produced kiwifruit. The Kiwifruit Authority has also been investigating an appropriate means of measuring the relationship between price and volume and the effect of promotional activity on that relationship. While kiwifruit admittedly is uniquely placed and has an exigent claim on such market research because of the nature of the product as a luxury, price-sensitive fruit whose market position has not yet stabilised in most countries, there is nonetheless a need for market knowledge of this kind in respect of all agricultural products, particularly those whose markets and structures in the past have been protected or insulated and commodity-oriented.

7.6.9 The spectacular success of the kiwifruit derived from a happy coincidence of it originally being the right

Infogram 7-V

Weighted Average Return Per Tray of Export Kiwifruit for the Seasons from 1973 to 1983 Inclusive

Season	Export Volume (trays)	Return Per Tray $1/tray[1] Current	Real[2]
1973	367,002	2.82	10.22
1974	738,040	2.91	9.46
1975	735,399	3.36	9.51
1976	1,386,823	5.15	12.44
1977	1,675,019	5.51	11.63
1978	2,157,934	6.82	12.96
1979	4,028,242	6.44	10.62
1980	4,143,306	7.98	11.32
1981	6,213,901	7.99	9.82
1982	4,668,346	11.17	11.77
1983	10,546,397	7.78	7.78

[1] Weighted average pool prices (or equivalent prior to pool accounting) before pool cool storage and grower's share of the New Zealand Kiwifruit Authority levy.

[2] Department of Statistics All Groups Consumers Price Index used September year end, 1983 = 100

Source: New Zealand Kiwifruit Authority, September 1984

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7.7 Other Fruit

7.7.1 As noted earlier, the growth rate of 'other fruit' has in the past five years been higher than that of kiwifruit. However, it has not been possible, for the reasons given in paragraph 7.2.5, to assess the market prospects for the smaller fruit export items in terms of supply and demand in each country. Infogram 7-VI, however, gives some idea of New Zealand's significance in world production of the major items concerned.

7.7.2 Information on which to base an assessment of market prospects for these smaller fruits is exceedingly sparse. It tends to be limited to peaches, lemons and oranges, and is not generally sufficient to allow any consistent and verifiable comparative assessment of current export market performance or market prospects*. For this reason, most of the judgements that have been made concerning blackcurrants, boysenberries, blueberries and babacos, and now nashi, are largely based on a subjective evaluation of advice and comment received from various sources. Yet this is an area in which soundly based market research should first precede and then parallel the development of plant breeding and multiplication programmes. Experience in the marketing of fresh foods (in the case of New Zealand, with kiwifruit specifically) has led to the identification of the basic characteristics required of any new fruit item likely to achieve a significant market penetration at least in the more sophisticated and higher-priced markets.

7.7.3 The statistical information available did not allow a systematic country-by-country assessment of market prospects for each horticultural product. Although there have been problems associated with grading, packing and quality control from time to time, New Zealand growing conditions are conducive to good quality production of most temperate and some sub-tropical fruits. Indeed, the problem has been that ease of production has, as with our major commodities, sometimes

* One indicator which has been used in New Zealand from time to time for planning purposes is the 'gross export earnings per hectare' that can be calculated for each fruit. This takes into account not only the volume exported, the unit price received, but also the yield productivity of the fruit. The figures assume, however, a constant yield between land devoted to export production and that to domestic production among regions. Moreover, it does not differentiate between 'bearing' and 'non-bearing' areas, nor does it take into account yields per hectare of low-grade fruit which have a significant effect on the grower's return.

Infogram 7–VI

New Zealand Contribution to World Production of Certain Fruits

Product	*Exports M$ fob (1983)*	*Growth rate (1978–83)*	*Export Volume (000 MT) (1983)*	*$/tonne*	*National Production 000 MT (1981)*	*World Production*	*NZ World %*	*NZ Area (h.a. 1981)*
Strawberries	5.4	41%	1.0	544	4.2	1,675	3%	298
Avocadoes	0.6		0.08	770	0.2	1,534	–	321
Peaches	0.6		0.24	259	17.9	7,309*	.2%	1179
Nectarines	1.2		0.46	251	5.1		–	480
Blueberries	0.6		0.08	727	0.03			259
Raspberries	0.6		0.05	1237	1.5	217	7%	400
Cherries	0.3		0.08	390	0.7			128
Tamarillos	0.3	32%	0.09	295	2.2			439
Oranges	0.2	136%	0.19	112	8.0	44,590	–	985
Lemons/Limes	0.2	47%	0.14	128	4.2	5,403		985

*Peaches and nectarines included together.

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obscured a proper appreciation of the need to relate production to specific market requirements, as experience with babaco testifies. As a consequence, market strategies have tended to be short-term and sometimes shortsighted, there have been claims and charges of weak selling by exporters lacking a knowledge of the market, and an associated lack of commercial cohesion within some industries. Recent fluctuations in the export returns from some of these products have in part been related to these problems.

7.7.4 The horticultural industry is not unaware of the need for more market intelligence on which to base production and export decisions for the 'smaller' fruit products. Many case studies have been done by, *inter alia*, the Horticultural Market Research Unit, into the prospects for individual products in specific markets, and also by more narrowly-focused agencies such as Japan Trade Research Associates. However, there is clear evidence of a need for greater coherence within and between the 'smaller' horticultural product industries in both research and managerial activities.

7.8 Processed Fruits

7.8.1 On past experience, it is exceedingly difficult to establish a viable horticultural enterprise unless there is a substantial outlet for fresh produce—comparative costs and competition are much tougher for processed fruits. This appears to apply equally to domestic and to export markets. However, since it is impossible to produce export quality fruit without also growing 'processing' quality, a viable processing industry is an essential concomitant. The definite relationship in all markets between a demand for fresh fruit and a lagged demand for processed fruits, could no doubt be further exploited by New Zealand.

7.8.2 The greater the degree of further processing, the more difficult it is to capture taste preferences so as to gauge market reaction to a particular product. The market, to recapture one comment, has an enormous capacity for becoming confused at the consumer end: if for example, a pulp or puree fruit product is unpopular, it is considerably more difficult for the consumer to identify the problem and thus for research to elicit the information and for the processor or producer to remedy it. The relationship between flavour, appearance and texture and the particular type of processing—whether freezing, pulping, dicing, or slicing for example—is more complex. In short, the 'ideal' consumer product is that much more difficut to achieve. The need to minimise weight and bulk for transport purposes and to increase shelf-life are added challenges. These problems are not insurmountable, however, and simply highlight the need, already identified in relation to agricultural products, for an increasingly sophisticated array of commercial, technical and managerial resources within the New Zealand food industry. This leads to a point which needs to be underlined. One of the most fundamental and necessary changes facing the agricultural sector is that it should start to see itself, not as a separate sector, but as an integral element in the food system. This point will be addressed in more detail in Chapter 8.

7.8.3 Determined efforts are currently being made at government and industry

level to improve the structure and performance of the export sector. International quality standards are being introduced this year for boysenberries and raspberries and the need for similar standards for all processed and semi-processed products is recognised. Arrangements have been made to allow more technicians to graduate from 'reactive' research and development work in the food processing industry, where the task is to remedy faults, into product development. With kiwifruit, for example, canned slices have been subject to various overseas promotions for five years or so, and in the past year, frozen slices have also been exported. These slices are used primarily by the wholesale bakery trade but also go into direct retail distribution. Samples of dried kiwifruit and glazed kiwifruit have been sent overseas, and interest in some markets has also been shown in freeze-dried kiwifruit. Kiwifruit wine exports are increasing. In the semi-processed area, kiwifruit pulp, both dried and puree, has been exported in recent years for jam, yoghurt and ice-cream manufacture, and there is interest in the export of kiwifruit juice concentrate. Although vulnerable to colour loss and change of flavour, this could, like apple juice, be useful for blending for beverage manufacture. Success will depend largely on skill in marketing and promotion. In addition to its export potential, kiwifruit has a potential for import substitution for beer manufacture. Enzymes from kiwifruit may be able to replace those hitherto extracted from papaya.

7.8.4 Import substitution may be possible in other fruit product areas. Dried apricots may substitute for raisins and sultanas and apricot pulp could substitute for Spanish apricot juice for local beverage blending. There may be similar possibilities for peaches, nectarines and citrus fruits, including the export of pulp to Australia for joint-venture processing. Cherry processing for kirsch and glacees in the food manufacturing industries overseas is another area with export potential.

7.8.5 There is vast untapped potential for co-ordination between the horticultural and dairy industries for flavoured fruit processing for food bases for dairy desserts, perhaps exported in bulk as a basis for further processing off-shore by New Zealand-owned enterprises. This again underlines the need to think in terms of a food industry rather than an agricultural sector or a horticultural sector. Berryfruit processing also offers both an opportunity and a challenge to New Zealand. For example, strawberry processing seems either non-existent or extremely limited in the world, and yet there would appear to be definite export potential for processed strawberry products over the next ten years. Similar possibilities exist for boysenberry processing, currently undertaken only in the USA and then only for the local market. While boysenberries are too perishable for easy exporting in bulk as fresh fruit, their distinctive flavour offers much potential for processing. There may be some scope for exports of processed blueberries, particularly to Asia where Canadian competition would be less pronounced. There would seem to be less prospect for blackcurrant processing, as a consequence of strong and increasing competition from Northern Hemisphere countries, particularly in Eastern Europe. Processing of sub-tropical fruits is also under investigation: par-

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Infogram 7-VII

Cut Flowers: Short
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— France
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— Netherlands
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Source: Coop. Vereniging Ve

ticularly feijoas and tamarillos for dairy desserts in co-operation with local dairy manufacturing companies.

7.9 Ornamentals

7.9.1 New Zealand is very small in global trade in ornamentals. In 1981, world exports totalled US$1,516 million of which cut flowers accounted for 68%, live plants 27% and starting materials 5%. Holland dominates the trade with a 59% market share in 1981. Denmark and Colombia accounted for 7% each, Israel 6%, and Italy and Belgium 5% each.

7.9.2 New Zealand's exports totalled NZ$3.40 million in 1981, only 0.05% of total exports. Trade was evenly spread between live plants (35%), cut flowers (33%) and starting materials (32%). Since then exports have increased rapidly but still constitute a minute fraction of total exports. The major items are carnations ($1.1m), orchids ($0.8m), exotic plants ($0.6m), roses ($0.3m), indigenous trees and plants ($0.3m) and chrysanthemums ($0.08m).

7.9.3 Infogram 7-VII shows the salient features of the principal import markets for cut flowers.

7.9.4 It is evident that there is a strong and expanding export market for ornamentals. While there are constraints on the ability of a remote country to export bulk, light-weight, fragile items such as cut flowers for which product presentation is critical, the rapid increase in exports from Europe to North America suggests that these impediments are becoming less significant. Moreover, Colombia is able to market its cut flowers competitively in West Germany, Britain and Sweden, no closer than Hong Kong or Japan are to New Zealand.

7.9.5 No projections of demand and supply of ornamentals are available and an assessment of market growth prospects is

Infogram 7-VII

Cut Flowers: Short-term Market Expansion Possibilities

Country	Import Market Size ($ mill)	NZ Market Share	Principal Competitor's Share	
USA	101.3	0.1%	Colombia	73%
Japan	5.4	2.0%	Thailand	61%
Hong Kong	0.72	25.0%	Thailand	53%
Australia	0.59	22.0%	Singapore	78%
Argentina	8.0	—	Colombia	100%
EEC	366.6	0.01%	Netherlands	35%
— FRG	78.4	0.002%	Netherlands	94%
— France	43.9	0.1%	Netherlands	68%
— UK	38.3	0.1%	Israel	59%
— Netherlands		0.002%		—
— Other				
Switzerland	51.0	0.2%	Netherlands	48%
Austria	30.0	0.001%	Netherlands	72%

Source: Coop. Vereniging Verenigde Bloemenveilingen Allsmeer, Netherlands (1982).

difficult. At the same time, general indications point towards substantial market growth opportunities in ornamentals in the future. In the eight years 1973–81, world exports rose at an average annual rate of 15.5%, and the total growth over that period (230%) was significantly higher than that of all world exports (200%). It is notable that this faster growth in what is effectively a high-income, luxury product area should occur during a period of international recession. Past growth does not of itself conclusively mean future high growth, but the evidence of recent global trends suggests not only strong and growing effective demand, but also advances in the technological and economic feasibility of meeting this demand at least in part with imports. Given New Zealand's natural climatic and seasonal advantages and relative freedom from plant diseases, there are compelling arguments for increasing our involvement in the export of ornamentals.

Chapter 8

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Chapter 8 **Summary and Conclusions**

8.1 Introduction

8.1.1 Trends in world demand support an optimistic view of the future for agricultural exports but major changes have been occurring in the pattern and structure of world demand and trade. Difficulties encountered by New Zealand have arisen largely because the agricultural sector has not adjusted rapidly enough to those changes and the future of New Zealand's agricultural industries depends critically on their ability to demonstrate more flexibility in responding to the changing demands of world markets.

8.1.2 This chapter draws together conclusions from the preceding chapters, considers the major changes in patterns and structures of world markets and discusses ways in which our agricultural industries can improve their responsiveness to change.

8.2 Basic Approach

8.2.1 The basic analytical approach adopted in this study, as outlined in Chapter 1, is that a strategic analysis of the prospects for our agricultural exports should concentrate first on longer-term world demand and consumption prospects for the general categories of products in which New Zealand has a particular interest. With that general backdrop in place, the spotlight can be focused on a more specific examination of supply and demand trends for the various competing products, and how these trends may be reconciled at global, regional or country levels. This of course necessitates consideration of other factors which will influence that reconciliation, such as government policies affecting agricultural production, consumption and trade.

8.2.2 It will be clear from this that the purpose is not to prescribe what New Zealand's exports should be in 2000 but to develop and present better information about the longer-term market environment New Zealand producers, processors and exporters must expect to face. Thus, the exercise is intended to be an input into the production, marketing and investment decisions which must be taken over the next few years by those with responsibilities in these areas.

8.2.3 The study does not pretend to present a final and definitive study of all the factors mentioned above. It outlines and sketches in a framework for analysis which can be discussed, extended and refined, and immeasurably improved: however, it is more relevant to New Zealand concerns than the various international studies, and more detailed and comprehensive than the previous New Zealand studies to which it owes a great debt. The study concentrates mainly on meat and dairy products, with less intensive study of wool and horticultural products. Arable crops and the other, presently minor, enterprises are not covered but it is acknowledged that they need to be included within any further study in this area.

8.2.4 Consumption trends are given first priority because the fundamental forces driving potential consumption—population, incomes and expenditure patterns—establish the back-drop or base-line against which the impact of other factors can be assessed. If one is interested more in tactical, shorter-term prospects, that backdrop is less important. But if the focus is on strategic decisions of longer-term significance, involving major production,

processing and marketing strategies, and substantial investments in human capital, research and training, or in physical infrastructure and facilities, then getting the backdrop right is vitally important. It is even more crucial if, for example, a major change in land use from pastoral farming to forestry is being considered. When the point of interest comes down to a particular product or country market, no base-line study can provide information of the quality and detail needed but it can provide a context, a means of screening off markets of no potential interest, and a starting point for more narrowly focused studies in markets which appear to have potential prospects.

8.2.5 The general picture of world trends in population and incomes, and the shifting pattern of those trends between different groups of countries, is relevant to all our exports.

8.2.6 The analysis in Chapter 1 adds to those two factors an analysis of trends in food consumption patterns because these affect our major meat and dairy industries and because changes in consumption patterns for high protein foods are of particular significance in assessing market prospects.

8.2.7 There is a clear tendency for populations to shift from reliance on root crops and cereals to the inclusion of higher protein livestock products in their diets as incomes rise. However, there is some evidence that at the high income end of the scale, consumption of meat and milk products reaches saturation point where further increases in incomes no longer produce increases in the volume of consumption. Personal spending on food may still rise but it is likely to be directed into buying a greater variety of foods (including luxury fruits), and into buying food in more processed form—for example in pre-cooked and packaged form or as restaurant meals.

8.2.8 Understanding the evolution of consumption patterns is fundamental to sound market development strategy. It determines whether a supplier can expect volume growth—perhaps even in cooperation with other suppliers—or whether the aim must be to hold and expand market share against other suppliers. It is a major factor in determining whether increased total earnings can be expected from expanding volume sales or whether market share and total earnings will be more dependent on being able to position products in a higher-priced, higher quality segment of the market.

8.2.9 While this is a somewhat simplified picture of the market implications of consumption patterns, it is an important and relevant simplification for the longer-term prospects of agricultural exporters which has apparently not been well understood by planners and decision-makers in New Zealand.

8.2.10 Income distribution, as well as average levels of per capita consumption, is a critical factor in determining trends of consumption. A country with high rates of population and income growth may also show very unequal distribution of income. A relatively small proportion of the population may have achieved 'saturation' consumption of high protein food while the mass of the population is still too poor to escape their cereal or root

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8.3 Trends in the 1970s

8.3.1 Trends in the 1970s, discussed in Chapter 1, illustrate the substantial changes that are occurring in world patterns of population and income growth, in food consumption and production, and in the expansion and diversification of agricultural trade.

8.3.2 Populations and incomes have been growing less rapidly in the developed market economies than in other countries and these countries, New Zealand's traditional markets, are showing relatively stable or even declining levels of per capita demand for high protein animal products. At the same time production in those countries has been rising so that competition for market shares has become much sharper.

8.3.3 In middle-income and newly industrialised countries, faster rates of population and income growth have produced rapid rates of increase in demand for food, and for livestock and horticultural products in particular. In many cases this has been reflected in increasing import demand. Demand has also increased strongly in centrally planned economies resulting in substantial but unpredictable imports of livestock feeds and livestock products.

8.3.4 In general, although the 1970s produced lower growth in world incomes and trade than the two previous decades, agricultural trade was least affected: the pattern of demand shifted and produced a substantial increase in trade. As noted in paragraph 1.8.2, many exporting countries achieved dramatic increases in their earnings from agricultural exports. New Zealand's failure to share in this indicates that it was less successful in adapting its production and marketing to changing world demand.

8.4 Global Prospects

8.4.1 Forecasts of trends to the year 2000, examined in Chapter 2, indicate that these changes in the pattern of world growth are likely to continue, and that the challenge to improve New Zealand's ability to adjust will therefore persist.

8.4.2 The world's population will continue to grow but not as rapidly as in the 1970s. The decline in growth rates will be most marked in the high-income developed countries whose share of the world's population is expected to fall from 18% to 15%.

8.4.3 The forecasts of economic growth used in this study* suggest that the world economy will continue to grow at about 3% a year with this rate rising towards the end of the century, but growth is expected to be slower in the developed market economies and the lower-income countries. Thus while New Zealand's traditional major markets will still account for most of the world's income, their share is expected to decline from two-thirds to about half by 2000. The middle-income, newly industrialised, and centrally planned economies, continuing their somewhat faster rates of growth, will increase their share from about 30% to over 40%. The rise in per capita incomes in these countries can be expected to result in substantial changes in patterns of expenditure particularly on high-protein foods.

8.4.4 In the newly industrialised and middle-income countries particularly, per capita consumption of meat and dairy products is beginning to rise quite rapidly from very low levels and there is scope for literally enormous expansion in total demand before approaching the 'saturation' levels indicated by experience in the high-income countries.

8.4.5 How this potential demand will be expressed depends on a great many market and policy choices which may or may not favour New Zealand's exports. Possibilities range from development of tastes for white rather than red meats, or for vegetable oils and fats rather than milk, to development of domestic livestock industries based on local or imported feeds, to deliberate suppression of potential demand by prices or quotas.

8.4.6 The choices made, whether by governments or consumers through the market, will be influenced by their knowledge of the options available. If New Zealand exporters sit back in their traditional markets and wait for the new demand to come to them, they will be disappointed. Imports of products from New Zealand are not the solution that springs most readily to the mind of traders in Chieng Mai or supermarket operators in Jeddah, nor to Ministers of Food and Agriculture in Lagos surrounded by FAO advisors trained in the cereal systems of North America.

8.4.7 None of these countries is likely to emerge as a mass market taking a dominant share of our exports, and the total potential demand is many times more than New Zealand could possibly supply. But gaining a relatively small share of that potential in a range of countries would give our products an important toe-hold in their evolving agricultural and nutritional systems and provide ample scope for expansion of New Zealand's earnings from agricultural exports.

8.5 Product and Country Markets

8.5.1 The approach adopted in Chapters 3 to 7 of the study provides an initial screening of the potential and characteristics of markets at a more detailed product and country market level. It should be remembered that the analysis does not pretend to predict what will happen in these markets. The actual outcome will be determined by a great many factors which neither this nor any more sophisticated study could predict—including

* New revised forecasts are expected to be available early in 1985

notably the effectiveness of the efforts made by New Zealand producers and marketers in the future. However the 'crude gap' methodology does provide, at least for livestock products, an initial guide to where market prospects are likely to improve or worsen and where further market research and development might be expected to produce the best returns.

8.5.2 Obviously, a positive crude gap for beef in the year 2000 of 2.3 million tonnes does not mean that the world will consume 2.3 MT more than it produces in that year. But it does indicate the direction and strength of the forces working in world beef markets and the likelihood that the process of reconciling demand and supply between now and then will provide producers with the opportunity to sell greater volumes.

8.5.3 Similarly, an estimate of a negative crude gap for milk products in Yugoslavia of 4 million tonnes in 2000 should not be interpreted as a reliable forecast that Yugoslavia will be an exporter of that magnitude and will provide no opportunities for sales by New Zealand exporters. But it does indicate that anyone committed to developing a longer-term market in Yugoslavia for New Zealand milk products should expect, on current trends, to be swimming upstream against local competition and should either choose another market or at least develop a very clear strategy for positioning their product against domestic market and probably political forces.

8.6 Meat

8.6.1 The prospects for New Zealand meat exports are clearly a matter of great concern at present. Examining them in a longer-term context can help to determine whether present difficulties are an indication that world market trends are running against meat producers in general (suggesting for example that farmers should be switching to horticulture or forestry), or that our producers have been poorly positioned in world markets.

8.6.2 World production, consumption and trade in meat have been growing rapidly and are projected to continue to expand. Prospects for meat producers in general are excellent. At a more detailed product and market level, prospects are more mixed but still encouraging. Provided that the New Zealand industry can develop an improved capacity to adjust to the changing patterns of world demand, it should have a profitable and expanding future.

8.6.3 The trends examined in Chapter 4 indicate both short-term and longer-term opportunities for expansion of New Zealand's meat exports. As might be expected from the earlier discussion of changes in patterns of expenditure on food, most of these opportunities will occur in markets which New Zealand has entered only recently—in the Western Pacific Seaboard and the Middle East and North Africa. In more established markets, growth in earnings will need to come from shifting products away from the traditional commodity trade and fighting more aggressively for a share of the consumer product segment of the market. In both cases improved knowledge of consumer requirements and the development of closer links with local market structures will be needed.

8.6.4 Competition between different meats is becoming increasingly important, and, as Clough and Ojala[17] point out,

white meats (pork and poultry) have shown the greatest increases in world consumption. This is sometimes interpreted as indicating an inexorable trend in consumer tastes working against the prospects of New Zealand exporters of red meats. Even if this were so, the potential increase in world meat consumption is so large that only a very small share of it would accommodate substantial increases in the volume of New Zealand exports. But there is ample evidence that consumer tastes are not predetermined—that they can and do alter in response to increased availability of different meats, changes in relative prices, and well-managed promotion and market development. The growth in production and consumption of white meats owes much, as Clough and Ojala argue, to the fall in price resulting from their more rapid development and introduction of technological improvements compared with red meats.

8.6.5 Pigs and poultry, as noted earlier, are more efficient converters of grains and other feeds. Dramatic improvements in the productivity of feed crops, stability of supply and ease of transportation of feeds, research and investment in the technology of concentrate feed systems, trade policy preferences for imports of feeds to supply domestic livestock industries, and aggressive marketing of the technology of feed systems particularly for pig and poultry production, have all contributed to their apparent advantages over red meats. But it is far from clear that white meats, which must rely on concentrate feeds grown on high quality crop land (and therefore must compete directly with food grain production) have any permanent efficiency advantage over grass fed livestock production. The self-sufficiency of domestic livestock industries based on imported feeds is superficial, and there would appear to be ample scope for improvements in the technology of red meat production.

8.6.6 New Zealand certainly has opportunities to diversify from its concentration on beef and sheepmeats into pork and poultry, and into venison, goat and rabbit production if domestic price relativities between feeds and livestock products reflected international market price relativities. There may be some advantages to be gained from the marginal use of feeds to 'finish' beef and sheep. But there is also ample scope for improving the efficiency and market positioning of our traditional red meat production.

8.6.7 The increasing importance of competition between red and white meats, of the links between them and the production and marketing systems of grains and other feeds, and the links to the dairy industry both through the feed industry and through dairy cattle supply to the beef industry, provide the most dramatic example of increasing complexity and integration in the world food system. The longer-term viability of New Zealand agriculture depends critically on its ability to understand and respond to these trends in its production, processing, marketing and trade policy.

8.7 Milk

8.7.1 On present indications, the longer-term world supply and demand trends for traditional dairy products are not encouraging. Supply and demand will continue to expand, though not as rapidly as for meat, and the crude gap analysis indicates

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a continuing structural surplus in world dairy markets. A major factor in this analysis is the constant policy assumption of no basic change in the domestic support systems in Europe and North America. Recent shifts in United States policy and the achievement of long-promised reform of the Common Agricultural Policy in the European Communities could conceivably produce substantial improvement in world market prospects for dairy exporters. Whether this occurs will depend on whether the price disincentives being introduced are sufficient to offset the improvements in productivity and profitability resulting from rapid structural adjustment and technological innovation.

8.7.2 However, in recent years the New Zealand dairy industry has shown that adverse global market trends are not insurmountable. Gloomy predictions of its demise have been proved wrong. A strategy based on the diversification and sophistication of production and marketing, combined with improved processing flexibility and good support from trade policy negotiators, has produced an industry able to provide its farmers with returns sufficient to encourage them to continue to invest in improved and increased production.

8.7.3 The longer-term trends indicate that this effort must be continued. Growth in potential demand, particularly in countries with rising populations and lower but more rapidly increasing per capita incomes, provides opportunities for expanding volumes and earnings from exports. The relatively stable high-income markets still offer some openings for increased earnings per unit sold both from sophisticated inputs into food processing industries and from luxury products for the final consumer.

8.7.4 Turning these opportunities into reality requires close attention to meeting customer requirements in each market segment, maintaining technological and market development and diversification, improving cost-efficiency within the industry and continuing trade policy strategies to retain access to traditional markets, to reduce the pressures from subsidised competition and to prevent the imposition of barriers to new markets.

8.8 Wool

8.8.1 Changes in world markets for fibre and fibre products have presented difficult challenges for New Zealand's exports of wool but the prospects are not discouraging. The rate of growth in world fibre consumption slackened during the 1970s to 3% a year compared with 6% earlier, and wool along with other natural fibres has encountered increased competition from synthetics.

8.8.2 However the overall rate of growth in demand for textile fibres is expected to recover as the world economy moves out of recession, and that forecast growth rate is much higher than the expected rate of growth in wool production. The market position and prospects for wool, particularly the coarser wools in which New Zealand specialises, have improved.

8.8.3 The marketing problems for wool appear to come less from final consumers than from the processors who choose between wool and synthetics as their raw material. This suggests that attention needs to be focused both on price and

supply stability and consistency of quality in the presentation of wool to processors, and on strengthening the industry's links with processing operations overseas and within New Zealand. In addition to improving the market share for our wool this strategy may also capture more of the added value of processing for the New Zealand economy.

8.8.4 The pattern of market prospects which emerged for meat and dairy exports is evident again for wool. Although final consumption is likely to remain concentrated in the developed countries of Western Europe and North America, it is the newly industrialised and middle-income countries which offer the widest spectrum of opportunities for growth of export sales. In centrally planned economies demand for fibres and wool in particular is expanding rapidly. The developed economies present sharper challenges to target marketing more precisely to those segments of their less rapidly growing markets which do offer the possibility of achieving higher unit returns for more processed products.

8.9 Horticulture

8.9.1 Because of the great number of different products grouped under the name horticulture, it is not possible to analyse demand prospects in the same way as for wool, meat and dairy products. However the general picture that emerges from the study is one of good prospects for demand growth in a wide range of markets. The difficulty will be to relate potential growth in demand for horticultural products generally, to specific export market potential for individual products.

8.9.2 In high-income populations with high levels of food consumption there is a tendency for fruit and vegetables to attract an increasing share of expenditure on food both for high-price luxury items and for food products. These markets also show strong demand for luxury non-food items such as ornamentals, including both cut flowers and shrubs and plants. In countries with lower and more rapidly rising incomes, new market opportunities are developing very quickly.

8.9.3 New Zealanders are now starting to appreciate the range of production possibilities our climate offers and the potential for developing substantial and diverse exports into both luxury and processing markets. However New Zealand is not the only off-season supplier to the large Northern Hemisphere markets; nor can it claim a monopoly on other advantages. The industry will need to develop and maintain a sound and more disciplined and systematic approach to both market and product research, and acquire the managerial and organisational skills needed to cope with volatile markets characterised by sudden variations in consumer tastes and supply conditions.

8.9.4 The apple industry, the traditional mainstay of our horticultural exports, is another example of an industry which has performed reasonably well against adverse world market trends. It has faced a pattern similar to that for meat and dairy products of increased competition in traditional markets and the emergence of new markets in the faster growing economies. The New Zealand Apple and Pear Board has built up an enviable reputation for the excellence of its grading and quality control procedures. Its perform-

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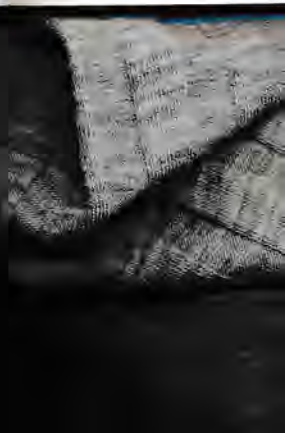

ance in leading the industry in adjusting to changing consumer preferences, changing technology and changing market circumstances may have been less convincing, particularly in relation to pears, but there have been some imaginative achievements in the domestic market. Its 20-year investment in producing new varieties is a reminder of the need for a longer-term perspective on market and product research.

8.9.5 The kiwifruit industry, with its more recent origins, has achieved spectacular results. Undoubtedly this owed much to having the right product at the right time, but subsequent growth has reflected a very effective institutional structure involving co-ordination and cooperation amongst participants while retaining a strong element of competition and rewards for innovation and dynamic marketing. The problem will be to sustain returns from increasing volumes of New Zealand production against the emergence of other suppliers. The advantages we now have result from 20 years or more of intensive effort in plant research and development: this effort must be sustained by the kiwifruit industry and emulated in the case of other products considered to have export prospects.

8.9.6 While no two products or market situations are identical, it seems that the experience gained in the marketing of kiwifruit is relevant to many of the other horticultural products being considered at the present time. If the right blend of discipline, coordination and entrepreneurship can be achieved, horticulture will be able to add a significant new element of strength and diversity to New Zealand agriculture.

8.10 Assessing the Outlook

8.10.1 As noted earlier, this is far from a complete coverage of the opportunities for expansion in New Zealand agriculture. Notable omissions are cereals and other crops, and industries based on other livestock such as pigs, poultry, deer, goats and rabbits, all of which are finding a place in our production pattern.

8.10.2 The general picture of trends in world demand for agricultural goods indicates that it should be possible for a well-organised New Zealand producer to find profitable outlets for these products. In some areas there is probably a minimum scale of operation below which an industry will be unable to support the research, marketing and handling infrastructure needed to retain a place in world trade, but for most products that minimum could be quite small. Large scale production and a guaranteed major market (such as we used to enjoy for lamb and butter) are not essential for efficient and profitable use of our land. For example, barley producers in New Zealand will never match the scale of the major cereal exporting countries, but that does not exclude them from finding a profitable place within the huge complexity of world grain trade. If they can achieve a better export return per hectare from barley than from finishing lambs, that provides a clear net benefit to the economy and perhaps a less tangible benefit in spreading our export risk.

8.10.3 While grassland farming should continue to provide the mainstay of our sheep and cattle industries, an expanding and more competitive arable industry may provide as a by-product the expansion of concentrate feeding either to finish sheep

and cattle for some markets or to provide a basis for exports of white meats.

8.10.4 From the national viewpoint, the scale of an industry is not of primary importance: its efficiency in using the resources it claims, whether for exports or import substitution, compared with other uses of those resources, is the most important criterion. Land is not the only resource involved. Comparative advantage will depend also on the efficiency of the input suppliers, farmers, bankers, processors, transporters and marketers responsible for the product's progress from farm to final market. The relative growth rates of different industries within our agricultural sector will depend crucially on how well each manages to organise that progress.

8.10.5 The rapid diversification of New Zealand agriculture in recent years demonstrates how far we have moved from the concept of land as a limiting factor which tied the economy to dependence on a narrow range of products. The land must now be seen as a much more diverse resource with most of it offering a choice of productive uses, for example between sheep, goats and forestry in some places, and between dairying, horticulture and annual cropping in others.

8.10.6 In assessing the conclusions of this study and their implications, it is worth referring back to 1967 when a series of articles by W.D. Rose and A.B. Ward reporting and commenting on projections for agricultural commodity trade appeared in the NZIER's *Quarterly Predictions*[36]. The projections, by the FAO and by A. Maizels and others in the *National Institute Economic Review*, were made, it should be noted, before Britain decided to enter the European Communities. They drew attention to the slow rates of growth in consumption in the United Kingdom for meat and dairy products with a consequent decline in import demand. The emergence of international surpluses of dairy products and of a wide range of new markets for meat were projected. One of the conclusions drawn by W.D. Rose is worth quoting in full:
"Fourthly the projections suggest that there will be a substantial growth in demand in the developing countries. This demand is however expected to be frustrated at least in the short term by balance of payments limitations. Nevertheless the magnitudes involved underline the fact that rapid economic development in any of these economies could create a substantial import demand."

8.10.7 Ward added comments from other sources to reinforce the warning against relying on markets in North America and Western Europe and the need to work on the development of new markets. He also drew attention to the difficulties of forecasting and the dangers of over-interpreting the results. "Projections should be used to indicate direction rather than absolute quantities. Trade projections even if correct," he noted, "merely reveal the extent of the commercial market that will be available. An individual country's share is a direct function of its total marketing effort."

8.10.8 Seventeen years later, this study is reinforcing and extending much the same message. New Zealand's traditional markets cannot be expected to provide growth in volumes of import demand. Trade restrictions on which our exporting

problems are often blamed only reinforce the fundamental changes taking place in those markets.

8.10.9 Projections such as these cannot forecast quantities of imports nor the share of potential markets New Zealand exporters will gain. There are a range of possible market and policy responses to the emergence of growing demand: how much of the potential growth is captured by New Zealand exporters will be a direct function of their total marketing effort.

8.10.10 Before turning to an examination of ways of improving the effectiveness of that total marketing effort, two additional aspects of that change should be discussed: the spread of markets and the increasing integration of food industries.

8.11 Spread of Markets

8.11.1 In 1967, when our major exports had characteristically been dependent on a small number of major markets, it was natural to search for another major growth market to replace one that was in decline. One point that is evident from the projections in this study is that they do not indicate the emergence of single major markets which can be relied on to take a dominant share of any of our agricultural products. What they do indicate is a much greater spread of markets emerging in a number of different countries around the world. Clearly there are some advantages in this in the spreading of our export risk—it should certainly reduce vulnerability to policy changes and thus reduce the fluctuations that have affected our export earnings in the past. But it also brings extra complications for our exporting industries.

8.11.2 It is exceedingly difficult to make the transition from bulk commodity selling to markets where New Zealand has traditionally maintained a high commercial and political profile, into marketing a wide range of higher unit value products in a large number of smaller markets. It is even more difficult when these new markets are to be found for the most part in countries whose customs, language, culture and even commercial structures are unfamiliar, and where New Zealand, as a country, is virtually unknown. If this is not bad enough, there is a further complication. These new markets are evolving fast, and their characteristics—the distribution system, consumer preferences and buying habits—are changing just as fast. This means market strategies must be based not on what people are buying today, but on what consumers will be wanting in five or ten years' time, when patterns of distribution and consumption will probably be very different. To achieve the benefits of the projected growth and spread of market opportunities demands knowledge of the economies and the marketing organisations, the languages and cultures, and the politics of a large number of countries in different parts of the world. Investment in obtaining this knowledge must be combined with the means of focusing it where it is needed: at the very least this involves better co-ordination of effort between universities, research organisations, companies and the public sector.

8.12 Integration

8.12.1 The increasing complexity and integration of food and fibre industries adds another dimension to the problems of adjusting to market changes. The days

of the Smithfield market or its equivalent as the simple, major channel into a stable, well-defined segment of consumer demand are long gone. In their place have emerged a variety of more sophisticated channels into more rapidly changing patterns of consumer demand and buying habits.

8.12.2 These include horizontally and internationally integrated food processing firms looking for competitive sources of supply for their raw materials, supermarket chains which know what their customers will buy and look for, suppliers who can match those specifications, and catering suppliers distributing to outlets ranging from fast food shops and canteens to high quality hotels and restaurants.

8.12.3 In each country New Zealand exporters must identify the best of those channels for establishing and developing acceptance of their products in the market, and learn how to meet their requirements. They must also be looking ahead and examining how consumer demand is likely to change over the next five to ten years, and which marketing and distribution channels are most likely to succeed in serving the needs of that changing demand.

8.12.4 Our exporting industries must recognise that they compete not only against alternative sources of supply for the products they sell, but against suppliers of alternative products. Wool is but one of the fibres between which textile industries and final consumers choose. Our experience in exporting berryfruit has shown that such products do not compete only against supplies from alternative sources. Their markets are conditioned by the fickleness and unpredictability of consumer behaviour. Our meat and dairy industries compete not only with the Argentinian cattle rancher and the Irish dairy farmer but with the cereals and feedstuffs industry with its grain, oil-seed, soybean and cassava growers and its forward contracts to the feed lots and the pig and poultry batteries.

8.12.5 Clough and Ojala have examined the impact of these changes on markets for New Zealand lamb pointing out that the outstanding growth of poultry consumption in all regions is not just, or even principally, a reflection of changing consumer tastes. It is a response to the more effective market development effort supporting the white meats. To match that effort, New Zealand industries must examine their product not within the narrow boundaries of its current place in consumer preference and its immediate competition, but within the wider context of potential demand for high protein foods, and alternative sources of supply.

8.12.6 The more industrialised concentrate feed systems have been undertaking the strategic research and investment to secure their place in the new demand growth markets. If New Zealand's grassland farming is to secure a larger share of the enormous potential growth in world meat demand, it too must lift its sights from shorter-term tactical competition in existing markets to include a better appreciation of longer-term strategic developments in this increasingly integrated world market.

8.12.7 In these circumstances, gaining the maximum net return to New Zealand will require more effective links between farm producers of the raw material and

the processors and distributors who add value and present the final product to the consumer. The location and ownership of those processors and distributors are less important than their effectiveness in expanding sales and adding value. Further processing within New Zealand has obvious attractions—in producing more employment and higher returns to the New Zealand economy—provided that what is added is real value not just cost, that the final product remains competitive in the market, and that the vital linkage to changing consumer requirements is maintained. Where conditions in the New Zealand economy or in our processing industries make it difficult to meet those provisos, dogmatic insistence on further processing within New Zealand may well work against the interests of the agricultural sector and the economy as a whole. Often there will be advantages to be gained from investment in off-shore processing facilities or from joint ventures with local processors or distributors. The aim must be to develop the most effective linkages in the integrated chain from producer to final customer.

8.13 Change and New Zealand Agriculture

8.13.1 The prospect for the future then is for a world which offers considerable scope for expansion of New Zealand's agricultural exports, but which is increasingly diverse, complex, demanding and changeable. The study draws attention to the withering of traditional outlets, the emergence of new and dynamic potential markets, and the rapid and dramatic changes which are taking place in the structure of the world food system. These developments collectively are putting enormous pressure on traditional agriculture, and traditional agricultural institutions. In a nutshell, New Zealand agriculture is being required to transform itself from its traditional role as a giant livestock farm into a new role as a dynamic, sophisticated and well-integrated element in world food and fibre systems.

8.13.2 It is therefore important to examine the internal factors which affect the performance, and particularly the adaptability, of our agricultural industries. It had been intended that this study should cover that field as well as trends in world markets but, as noted in the preface, lack of resources led to the decision to concentrate attention on the external environment at this stage. As a result, many of the factors which have affected performance are beyond our scope. For example, much attention has recently been focused on the problems caused by poor macroeconomic management, by inflation rates higher than in competing countries, and by the consequent general difficulties in maintaining competitive cost structures in New Zealand. This study cannot add to debate on those issues beyond noting that they are important, but not complete, explanations of poor performance.

8.13.3 Other industries have performed better under the generally adverse conditions. Manufacturing exports, for example, have expanded rapidly against the general world economic recession and declining rates of growth in world trade in manufactured products. It is difficult to accept that import protection and export incentives for manufacturing are a sufficient explanation of either agriculture's

failure to adjust or its relatively slower growth.

8.13.4 The agricultural sector has continued to receive preferred access to capital, massive public sector support for research and development, and in some cases direct subsidies (SMPs). Moreover, within agriculture, performance has varied. Export earnings from horticulture and crops have grown very rapidly with less assistance than other sectors. The dairy industry has performed comparatively well under difficult conditions. The meat and wool industries have not done as well over recent years as was earlier expected.

8.13.5 While this study cannot offer more detailed comment either on the impacts of macroeconomic management or on these variations in past performance, its examination of likely world market conditions does point to three factors at the micro or sectoral level which will have an important impact on future performance—information, industry structures and trade policy support.

8.14 Information

8.14.1 The study reinforces the now widespread recognition that a great improvement is needed in the quality and quantity of information available to support market development. Concentration of research and information gathering at the production end of our agricultural industries has resulted in highly efficient farm systems. At a time when markets were few, well-established and stable, that concentration may have been justified. Clearly however we have entered a new era when old markets are declining and changing in character, when new and less well-known markets have emerged and are evolving or developing rapidly, and when the requirements of users and the competition from different products and sources are more open to change. In these circumstances market information in all its forms becomes increasingly important. As the discussion on the spread and integration of markets indicates, the network of information which needs to be gathered and organised into a form relevant to decision-making is very widespread.

8.14.2 Companies and other organisations involved in marketing require two different types of market information.

8.14.3 They need 'hard' information on prices, volume sales, market shares, and production and consumption data on which to base immediate and short-term marketing plans and decisions. This is the 'outlook' type of information which forms the basis of the annual agricultural outlook conferences sponsored each year in USA, Canada, Australia and increasingly in Europe. There have been moves to establish a similar exercise in New Zealand but so far without success.

8.14.4 The 'outlook' analysis has become increasingly complex because of the growing interrelationships between agricultural commodities. To estimate the likely price of beef on the US market in three months' time, it is more important to know what is happening in the cereals sector and whether pig and poultry production are trending upwards or downwards, than to know how US cattle numbers are trending. This is an aspect of 'outlook' work which does not appear to have been well understood in New Zealand, judging by the lack of analysts in government departments or producer

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organisations assigned to monitor developments in such international commodity markets.

8.14.5 The second type of information required by an exporting organisation is information on which to decide which countries or markets should be targeted for detailed investigation as prospective growth markets. What is required, as a first step, is a systematic and on-going market monitoring facility, screening relevant developments in all countries so as to identify those markets warranting more intensive investigation.

8.14.6 One of the aims of this study was to provide an initial framework for this strategic market intelligence. As noted earlier it does not pretend to provide the definitive assembly of that information—but it does provide a starting point for the establishment of such a system.

8.14.7 The need is for some readily accessible up-to-date source of international commodity market and trade-related data; the kind of broad-spectrum public data, available from FAO, the U.N., the EEC, OECD, USDA etc., which will provide a basis for any researcher or decision-maker to carry out his own analyses and reach his own conclusions as to which markets might justify more detailed on-the-spot investigations. There is a good case for establishing such a data-base as an independent facility, available to the public on a commercial basis. It would be financed by major users, such as large commercial firms, the producer organisations, government, universities and market research firms.

8.14.8 Ultimately such a data base, which could be linked to INFOS and other information systems, would become the repository for a comprehensive range of market-related information covering general economic, demographic, production, consumption and trade statistics, together with data on prices and national policies. It would of course concentrate on those commodities and countries of specific interest to its clients. Data coverage and sources would be progressively extended and refined on the basis of experience and user requirements. Although initially the unit would provide its customers with data rather than analysis, and interpretation of that data, it might eventually carry out confidential analytical or interpretative studies for individual clients on a contract basis.

8.14.9 If a move in this direction is not made very quickly, there is a real risk that various organisations will start to create partial systems which will be less effective and more costly, both to the organisations concerned and to the country. The need is for a public as distinct from a government facility, designed for and paid for by its user clients.

8.15 Structures

8.15.1 All industries develop market and institutional structures which provide some balance between the stability needed for investment and development, and the flexibility needed to adapt to changing conditions. Agricultural industries are particularly susceptible to market instability, but it is a common experience in many countries that measures introduced to overcome this problem tend to create an even more complex layer of problems. The fact that some parts of New Zealand agriculture have not been adapt-

ing rapidly enough to changes in world markets indicates that this situation may have arisen here and that some of our market and institutional structures are no longer functioning effectively. This study provides no basis for an exhaustive examination of that hypothesis but it does provide some indication of where problems might be found and how they might have arisen.

8.15.2 The extent to which an agricultural industry needs outside help—through government interventions in markets or legal authority for its institutions to regulate the industry—depends partly on its own strength and partly on the role it is perceived to play in the economy and in society. When farming consists of a large number of small producers lacking good communication with each other and dependent on 'urban' commercial and financial structures, they have a *prima facie* need for help, or at least some form of protection. Farming in New Zealand does not have that excuse. It is a sophisticated, well-integrated part of the economy—probably with more political and economic power than parts of our processing and manufacturing industries. One indication of that sophistication is the speed with which new measures of assistance are capitalised into higher land prices—so that assistance measures intended to help meet current costs or prices are rapidly offset by increased capital servicing costs. In these circumstances many traditional forms of assistance become ineffective or even counterproductive.

8.15.3 Attempts to provide protection from the destabilising effects of supply and price fluctuations provide examples. Outside assistance in managing income fluctuations is essential at early stages in the commercialisation of farming, but it becomes less necessary as farmers develop the capacity to organise insurance, price-smoothing or stock-management schemes. Some form of authority may be needed to manage these and to ensure that producers do not opt in when it is to their advantage, and opt out when it is not. If the costs of managing risk are met by government rather than by the industry, a highly commercialised community will respond by noting that farming is now a less risky business to be in and price up the value of land accordingly. There was certainly an element of this in the increasing cost of grain lands in the United States in the 1960s and it could be expected to occur in New Zealand.

8.15.4 The capitalisation of subsidies or other forms of assistance into land prices is relevant to what has been said earlier about the increased integration of the world food system. The comparative pricing of grasslands and high quality crop lands will be a significant factor in competition between grass fed beef and sheepmeats and concentrate-based white meats. It is not in the longer-term interest of New Zealand agriculture as a whole to have its major asset artificially over-priced.

8.15.5 Another problem with risk management systems is that unless they are very well designed, they may be used to buffer the government against political risk rather than the farmer against financial risk. This can give producers a false picture of market prospects. This is the more likely when government attempts to use the system to 'pick winners' and hence direct development (as happened recently with the SMP schemes).

8.15.6 There is a wider danger that political commitments to support one part of an industry may affect behaviour in other parts. Dairy processors in the European Community, for example, may feel little need to worry about whether the efficiency of their processing operations is providing sufficient incentive to keep their suppliers in the milk production business—they can leave that to the Common Agricultural Policy. It could be expected that something similar might have happened in New Zealand—that, for example, the commitment of governments to ensuring that sheep farm incomes were sufficient to maintain investment and keep sheep numbers rising, would influence the investment decisions of meat company managers. Particularly before the delicensing of the meat processing industry the resultant emphasis was on maximising through-put and current income, and less on investment in new market development and reducing operating costs—in other words towards stability and security at the expense of innovation.

8.15.7 Market development is sometimes regarded as being a particular problem in agricultural industries where a large number of suppliers, some interested in longer-term returns and others with greater short-term pressures, face a limited number of outlets. In practice, the extent of the problem, and appropriate solutions depend on the degree of commercialisation, and the transparency and sophistication of available market mechanisms. There is always a temptation in these circumstances to resort to licensing but this can lead rapidly to a stability which prevents the introduction of entrants and new marketing approaches needed to adjust effectively to changing markets. In other sectors, the problem would be overcome by the use of trademarks, by locking suppliers and end users into the risks of development, and by building loyalty to a brand through attention to quality and meeting customer requirements. This is the road along which New Zealand agriculture will need to travel if it is to transform itself from being a traditional primary industry into becoming a dynamic, well-integrated component of the world food industry.

8.15.8 Ultimately, there is no perfect form of industry structure outside the theoretical world of perfect markets. Current structures must meet current needs. The sophistication of agricultural industries in New Zealand and their links with commercial and financial institutions and markets have improved rapidly in recent years—to the extent that they should now be able to rely much more than in the past on more flexible market-oriented structures. Given these developments, much of the slowness to adapt to changes in world markets is likely to have been due to reliance on older, cruder structures which provided stability at the expense of adaptability.

8.15.9 Debates in New Zealand on these issues frequently tend to focus on the external form of industry organisations—boards, authorities, commissions, rather than on the functions for which they are needed, the internal operating efficiency and transparency with which they pursue those functions, and their accountability. Their legal form, statutory powers and structure are perhaps less important than their substantive ability to identify current needs and respond to them. Yet this

substantive ability is rarely questioned and their performance is not subject to the normal forms of external assessment and valuation.

8.15.10 Generally the conclusion from this study is clear—that in developing the institutional and market structures of our agricultural industries, the aim should be to achieve greater flexibility, initiative and responsiveness to change. This in itself implies greater accountability and transparency.

8.16 Trade Policy

8.16.1 New Zealand government agricultural trade policy efforts are probably best known for their rear-guard actions in preserving access for traditional exports to traditional markets. But since these markets cannot be expected to provide a base for growth in our agricultural exports, there is a need now for a major reorientation—to shift the trade policy emphasis to a more positive 'anticipatory' approach. The objectives and strategies for such an approach need to be formed and tested by a much more open process of industry consultation and public debate. A model for this, aimed more at future manufacturing exports, is provided by the debate and negotiation of the agreement on closer economic relations with Australia.

8.16.2 New Zealand's ministerial and departmental negotiators have proved themselves extremely capable in difficult battles against restrictions on agricultural trade. They can justifiably point to their success in planning and orchestrating an effective holding action in the EEC, to their successes in fire-fighting a continuing series of problems in North America, and to progress in chipping away at agricultural protectionism in multilateral forums such as the GATT. But the very difficulty of those battles against existing protection should be convincing evidence of the need to concentrate more on areas with potential for growth and to seek to anticipate and prevent the development of protectionist pressures in new growth markets.

8.16.3 The aim of an anticipatory approach to trade policy must be first to identify the markets and products which offer potential for growth over the next five to ten years, and then to set about creating the appropriate trade relations and policy understandings and agreements. Looking back over the last ten or 20 years for example, one might ask whether there was scope to do more to protect our increasing interest in horticultural products, particularly kiwifruit, or to preserve New Zealand's interests against the tendency for Japan to favour feed imports rather than trade in livestock products, and now to manage its protective mechanisms to favour beef imports from the United States rather than from New Zealand. Looking forward at, for example, the range of potential growth markets in the Pacific Basin, the Middle East, North Africa, Latin America and other regions, one is immediately confronted with the prospect of similar problems emerging in a number of middle-income and newly industrialised countries.

8.16.4 Clearly New Zealand has a particular interest in the national policy decisions which will determine how growing demand for livestock products in those markets will be met—in the extent to which the rules of the game will favour red meats or white, and imports of meat

and dairy products or imports of food for protected domestic livestock industries. In the Pacific Basin region, for example, there will be a growing divergence of interest between the concentrate-fed livestock systems and feed exporters in Canada and the USA, and grassland livestock product exporters in Australia and New Zealand. There could well be a case for establishing machinery now for informal consultations within this region on domestic agricultural and trade policy issues to ensure that decision-makers in those countries are fully aware of the options open to them and the efficiency benefits available to consumers as well as farmers from a rational approach to resource use and trade in the region. The research currently being carried out under the aegis of the Pacific Basin Economic Cooperation Committee would be relevant to any such initiative.

8.16.5 But this is only one possibility. More generally there is a need for a systematic review of our trade policy objectives and strategies, in both geographic and commodity terms, based on the new perceptions which are now emerging of how our marketing priorities are likely to evolve over the next five to ten years.

8.16.6 In future, we shall need to put increasing emphasis on an 'anticipatory' as distinct from a 'reactive', approach to trade policy formation. At this stage it would be beneficial to all concerned if government were to invite and encourage meaningful public discussion of the issues involved.

8.17 Conclusion

8.17.1 Finally, demand in world markets should not be a major constraint on the long-term growth of any of New Zealand's agricultural industries. The major constraint in recent years has been our slowness to respond and adapt to the changing patterns and structures of world demand. Although some general trends are clear, the trend which can be predicted with most confidence is that change will continue. Agricultural industries which maintain the attitudes and patterns of the 1950s will decline: those which develop a forward-looking capacity to anticipate and adapt to change have better prospects for growth.

8.17.2 Although in many areas New Zealand agriculture has been developing that capacity, progress has been too little and too slow: the challenge is to extend and improve speed of response.

8.17.3 A fundamental shift in attitudes, which has already begun must be carried through to completion—from the concept of dependence on a narrow range of primary commodities which only a few high-income, protectionist countries could afford, to a recognition of agriculture as a base for diversified food and fibre industries capable of discovering and meeting market needs in a wide range of products and countries.

8.17.4 The first part of this transformation is occurring. Our land is no longer seen as a resource suitable only for rearing sheep and cattle. Over the last 20 years we have come to realise that, with careful management for sustainable yield, it can support a wide range of agricultural and horticultural enterprises. Over the same period, the capability of our manufacturing sector has expanded dramatically, and the traditional barriers between agriculture and manufacturing are breaking

down with the development of more integrated food and fibre industries. Our economy as a whole is becoming less defensive, more confident of its ability to deal with world markets on an equal footing.

8.17.5 To continue and complete this transformation, our industries need better information services, more flexible and responsive market and institutional structures, more forward-looking and imaginative trade policy and promotion services, and indeed a general government policy environment which identifies and supports opportunities for change and growth. All too often the reverse has been true and those factors have become constraints. The aim of assisting the process of adjustment is ill-served by measures which bolster declining activities and otherwise provide incentives not to change.

8.17.6 Provided our economy and our agriculture can improve its response to these challenges, there is a real and exciting future for New Zealand agriculture, not as a traditional primary industry but as the base for, and an integral part of, new, outward-looking and dynamic food and fibre industries.

Appendix

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Appendix 1 **Technical Notes**

1. These notes are intended both as an introduction and as a commentary on the substantive chapters of this report. Because the study represents a new approach to sectoral planning, at least for agriculture, the basic methodology needs to be explained and understood before the conclusions reached in this report can be placed properly in context. But even more importantly, the inadequacies of the present analysis need to be highlighted in order to focus attention on the information and institutional deficiencies which need to be remedied if New Zealand is to move towards a more professional approach to the identification and exploitation of export market opportunities.

2. The purpose of Chapters 1 and 2 is to set New Zealand agriculture in its world context, as seen from an external, rather than a New Zealand, perspective. The aim is to establish the likely international production and marketing pattern to which, as an export-orientated industry, New Zealand agriculture will have to adapt and respond if it is to continue to play a significant international as well as national role. Although the trends and developments surveyed in this section of the report are of a very general character, they are focused on demand for food and those food markets which might have a significant role to play in determining New Zealand's future agricultural development. It was not possible with the time and resources available to give equal attention to demand for fibres and textiles as a backdrop to the analysis of the future role of wool in New Zealand's agricultural development.

3. Chapter 3 describes the basic methodological approach adopted in the more specific commodity analyses in Chapters 4 to 7. More importantly perhaps, it points to the improvements necessary in order that the individual commodity and product analyses might be improved and made more useful as a basis for strategic market planning.

4. The purpose of Chapters 4 to 7 was to assess the likely trend of demand in each country of the world for the products in which New Zealand has an existing or potential trade interest. 158 countries were included in the analysis. For the initial exercise, the study has been confined to the food products in which New Zealand has had a traditional and significant export interest—namely beef, sheepmeats, butter and cheese, preserved milk and whole milk. Work has also been undertaken on wool, apples and pears, kiwifruit and selected other horticultural products.

5. Chapter 8 seeks to draw conclusions, not only as to the planning and marketing implications of the analysis but also as to its implications for resource allocation, information requirements and the institutional and policy framework within which the agricultural sector and agricultural exports must develop.

6. **Infograms**
Readers may be somewhat mystified by the use of the term 'infogram'

used throughout this report. This would not be surprising in view of the fact that the term was 'invented' by the authors. It is applied to all data sets used to illustrate or reinforce the text, whether these be in tabular form, graphs, diagrams, charts or other presentations. The use of such a term has allowed the use of a simple sequential reference numbering system for all such material.

7. Classification and Definitions

(i) *Population figures* are mid-year estimates prepared by the World Bank on a country-by-country basis from material obtained from the UN Population Division, the US Bureau of the Census and the World Bank's own data files.

(ii) *Gross National Product* (GNP) is a measure of the total domestic and foreign output claimed by residents of a country. At market prices, GNP includes compensation of employees, operating surpluses, provision for the consumption of fixed capital and indirect taxes less subsidies to producers. GNP in current values of national currencies is converted to US dollars using a three-year weighted average of prices and exchange rates. The use of the three-year base period is intended to smooth out the impact of fluctuations in prices and exchange rates. However as the base period is changed every year, the data derived from the various editions of the *World Bank Atlas* are not strictly comparable. Hence the figures presented in infograms need to be treated with caution, particularly in respect of comparisons between countries and regions over the period covered. There is not yet available internationally a broadly acceptable methodology for the estimation of per capita GNP for centrally planned economies. As a consequence, the only centrally planned economies included in the basic GNP analysis used in this study are Hungary, Romania and China, for which World Bank data is available. Countries included in the general analysis but excluded from the income analysis are listed in footnotes to infograms, as appropriate.

(iii) *Gross Domestic Product* measures the total final output of goods and services produced by an economy—that is by residents and non-residents regardless of the allocation to domestic and foreign claims. It is calculated without making deductions for depreciation. For most countries GDP by industrial origin is measured at factor cost but for countries without complete national accounts series it is necessary to resort to market prices series. GDP at factor cost is equal to GDP at market prices, less indirect taxes net of subsidies. The projections of GDP and GDP per capita presented in Chapter 2 are in US dollar values, converted from domestic currency at the average annual rate of exchange for the period 1979/81.

(iv) *Commodity Classification and Definitions.* The commodity classification used throughout this study follows the United Nations Standard International Trade Classification (Revision 2). The definitions used in SITC Rev.2 are based on the 1955 Brussels

Tariff Nomenclature (BTN) of the Customs Cooperation Council. However it is possible that, because of differences in national commodity classifications, the sources from which the relevant tables have been derived may not be fully consistent in all cases. A further discrepancy arises through different methods of aggregation of data. For example, FAO *production statistics* exclude goatmeat from the classification 'sheepmeat'. However goatmeat is included in the sheepmeat category in FAO's *trade statistics* together with mutton and lamb.

(v) *Time References.* In general, data refer to the calendar year. The principal exception is in relation to trade data which relate to the fiscal year ending 30 June in the year stated in respect of Australia, Bangladesh, Gambia, Nepal, New Zealand and Pakistan or elsewhere as stated.

(vi) *Valuation.* In general export values are f.o.b. and import values are c.i.f. However, both imports and exports are f.o.b. for Australia, Bermuda, Bulgaria, Canada, Czechoslovakia, Dominican Republic, Panama, Papua New Guinea, Paraguay, Philippines, Poland, Solomon Islands, South Africa, USA, USSR, Venezuela, Zambia and Zimbabwe.

(vii) *Measures of Food Consumption.* Throughout this report per capita levels of food supplies and food consumption are expressed in calories and grams of protein. The following table from data supplied by the New Zealand Department of Health, indicates the approximate equivalence between these values and selected foods to which New Zealanders are accustomed:

1 thick slice of bread (1⅓ oz) = 94 calories + 3.0 grams of protein (vegetable)
1 portion uncooked rolled oats (2 oz) = 100 calories + 3 grams of protein (vegetable)
1 cup of cornflakes (1 oz) = 105 calories + 2.6 grams of protein (vegetable)
1 slice of ice-cream (2 oz) = 120 calories + 3.2 grams of protein (animal)
1 egg (2½ oz) = 80 calories + 6.0 grams of protein (animal)
1 lamb chop (4 oz) = 300 calories + 32.0 grams of protein (animal)
1 portion of grilled steak (6 oz) = 300 calories + 36.0 grams of protein (animal)
1 cube of cheese (1 oz) = 120 calories + 80 grams of protein (animal)
1 pint of fresh whole milk (20 oz) = 420 calories + 20.0 grams of protein (animal)

All dry cereals supply about 400 calories + 3 grams of protein per 100 grams, e.g. in *Ethiopia* food supplies in 1979/80 averaged 1,729 calories per head per day (1,580 vegetable, 150 animal) or 57.5 grams of protein per head per day (46.7 vegetable, 10.8 animal). Thus this would be equivalent to about two eggs and 15 slices of bread per day.

(viii) *Exchange Rates.* Table (i) presents the average annual exchange rates used by FAO in converting national currencies into US dollars for the computation of the production and trade data used in this study. The FAO acknowledges that in most cases the

exchange rates have been supplied by the International Monetary Fund, although in some instances data has been drawn from national sources.

8. **Grouping of Countries**

(i) The primary classification of countries throughout this study is based on economic and political criteria. However, countries have also been grouped together regionally so that categories are based on a combination of economic, political and geographic criteria. The Pacific Basin has been broken down into sub-regions for more detailed presentation.

(ii) *The Economic/Political Categories are as follows:*

a. *Developed Market Economies*
Generally but not exclusively 'market economies' with a GNP per capita in 1980 in excess of US$4,000 per annum.

Note: Because of their membership or association with the OECD, Portugal and Yugoslavia have been included in this category although the description applies generally to countries with a much higher level of GNP per capita.

b. *Centrally Planned Economies*
The centrally directed 'communist' countries of Eastern Europe, Central Asia and the Western Pacific Seaboard.

c. *Newly Industrialised Countries*
Countries with a relatively advanced level of economic development, with a substantial and dynamic industrial sector, and with close links to the international trade, finance and investment systems.

d. *Middle-Income Countries*
All countries other than those listed under A, B and C, with a GNP per capita in 1980 in excess of US$600 per annum.

e. *Low-Income Countries*
All countries other than Centrally Planned Economies in which GNP per capita in 1980 did not exceed US$600 per annum.

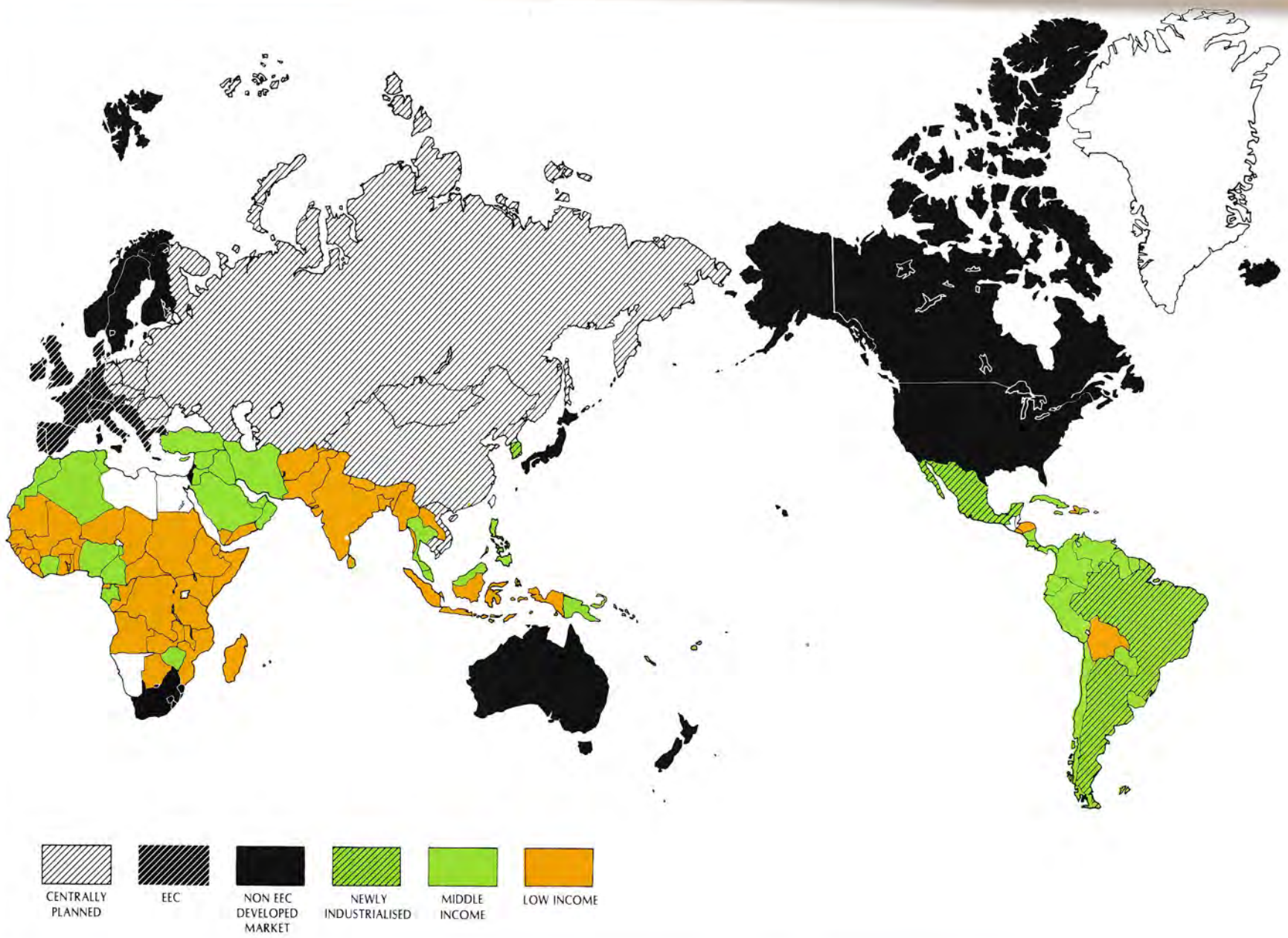
Note:

(i) It has become a convention in recent trade analysis to establish separate categories for the so-called 'Newly Industrialised Countries' (or 'NIC's') and for the 'OPEC' countries. For the purposes of this study the 'NIC's' category has been retained but the 'OPEC' category as such has been discarded because of the heterogeneous nature of the group. However, reference is made to the oil-producing countries as a group where this is deemed appropriate.

(ii) There are references in the text to OECD and OPEC. The membership of these organisations is as follows:
OECD (Organisation for Economic Cooperation and Development) comprises— Australia, Austria, Canada, EEC (Belgium, Denmark, France, Germany West, Greece, Ireland, Italy, Luxembourg, Netherlands, United Kingdom), Finland, Iceland, Japan, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, USA and Yugoslavia (associate).
OPEC (Organisation of Petroleum Exporting Countries) comprises— Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, Venezuela.

(iii) *The Regional Classification is as follows:*

a. Pacific Basin
- North America
- Western Pacific Seaboard
- Oceania


CENTRALLY PLANNED
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NON EEC DEVELOPED MARKET
NEWLY INDUSTRIALISED
MIDDLE INCOME
LOW INCOME

b. Western Europe
   — EEC
   — non-EEC
c. Eastern Europe/USSR
d. Middle East
e. Central Asia
f. Latin America
g. Africa

(iv) The countries included in the Chapter 1 analysis are:

Pacific Basin—North America—Developed Market: Canada, USA

Oceania: Low-Income—Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu
Middle-Income—Cook Islands, Fiji, French Polynesia, Kiribati, Nauru, New Caledonia, Pacific Is (US), Papua New Guinea
Developed Market—Australia, New Zealand

Western Pacific Seaboard: Low-Income—*East Timor, Indonesia*
Middle-Income—Brunei, Macao, Malaysia, Philippines, Thailand
Newly Industrialised—Hong Kong, Korea (South) Rep., Singapore
Developed Market—Japan
Centrally Planned—Kampuchea, Korea (North) Demo., Vietnam

Western Europe

EEC—Belgium, Denmark, France, Germany (FRG), Greece, Ireland, Italy, Luxembourg, Netherlands, United Kingdom
Non-EEC—Austria, Faroe Islands, Finland, Gibraltar, Holy See, Iceland, Malta, Norway, Portugal (inc. Azores and Majorca), Spain, Sweden, Switzerland, Yugoslavia

Eastern Europe/USSR

Albania, Bulgaria, Czechoslovakia, Germany East, Hungary, Poland, Romania, USSR

Middle East

Low-Income—Afghanistan, Yemen—Arab Republic, Yemen—Democratic
Middle-Income—Bahrain, Cyprus, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates
Developed Market—Israel

Central Asia

Low-Income—Bangladesh, Bhutan, Burma, India, Laos, Nepal, Pakistan, Sri Lanka
Centrally Planned—China, Mongolia

Latin America

Low-Income—Bolivia, El Salvador, Haiti, Honduras, St. Vincent
Middle-Income—Antigua, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Falkland Islands, French Guinea, Grenada, Guadaloupe, Guatemala, Guyana, Jamaica, Martinique, Monserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, St Kitts-Nevis, Anguila, St. Lucia, Surinam, Trinidad and Tobago, Uruguay, Venezuela
Newly Industrialised—Argentine, Brazil, Mexico

Africa

Low-Income—Angola, Benin, Botswana, Burundi, Cape Verde, Cen-

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Middle-Income—Algeria, Cameroon, Congo, Gabon, Ivory Coast, Libya, Mauritius, Morocco, Nigeria, Reunion, Seychelles, Tunisia, Zimbabwe (Rhodesia)

Developed Market—South Africa

(v) The countries included in the Chapter 2 analysis are basically the same as those included in Chapter 1. However, because of lack of data, the following countries are not included in the projections of population and GDP presented in Infograms 2-I to 2-III, and subsequently in the regional data summaries.

Pacific Basin—Oceania—All Low-income and Middle-income Countries

Western Pacific Seaboard—Brunei, Macao

Western Europe—Non-EEC—Faroe Islands, Gibraltar

Eastern Europe—USSR

Middle East—Middle-Income: Bahrain, Kuwait, Oman, Qatar, United Arab Emirates

Central Asia—Low-Income: Bhutan, Maldives

Latin America—Low-Income: St. Vincent

—Middle-Income: Antigua, Bahamas, Barbados, Belize, Bermuda, French Guinea, Grenada, Guadaloupe, Martinique, Netherlands Antilles, St Kitts-Nevis, St. Lucia

Africa—Low-Income: Botswana, Cape Verde, Cameroon, Djibouti, Equatorial Guinea, Guinea-Bissau, Lesotho, St Helens, Sao Tome and Principe

Africa—Middle-Income: Reunion, Seychelles

9. Sources of Data

(a) *Chapter 1*

Primary time series data on a country-by-country basis, underlying the analysis presented in Chapter 1 have been derived from the appropriate annual *World Bank Atlas*[37] in respect of *gross national product* and *population*, and from the appropriate *FAO Production Yearbook*[39] and *FAO Trade Yearbook*[38] in respect of *production, consumption* and *trade* data. The infograms presented in this chapter are therefore based on data from U.N. or national government sources although it is acknowledged that trade data are sometimes supplemented with data from unofficial sources or from trade returns from trading partners.

Statistical data derived from other sources are acknowledged at appropriate points in the text.

(b) *Chapter 2*

Basic projections of population, gross domestic product and gross domestic product per capita were derived from unpublished data developed by

FAO as part of the preparation and basis for the major study *Agriculture: Towards 2000*[2] published in 1981. In theory the 1980 figures should provide the link between the *ex post* analysis in Chapter 1 and the *ex ante* discussion contained in Chapter 2. In practice, however, the two sets of data are not strictly comparable for the following reasons:

(i) Income and population data used in Chapter 1 were based on World Bank and U.N. data, whereas that used in Chapter 2 were derived from FAO sources.

(ii) World Bank data for 1980 is based *ex post* on reported statistics whereas the FAO figures for 1980 are *ex ante* estimates prepared, in most cases, in 1979.

(iii) World Bank income data are based on GNP whereas FAO income projections are based on GDP.

(iv) Estimates and projections were not available for all the countries included in the analysis presented in Chapter 1.

The discussion in respect of each of the regions and sub-regions draws heavily on data presented in a recent publication *Global Demand for U.S. Food and Fiber*[7], October 1983, which represents a very similar type of analysis, but from a US rather than a New Zealand point of view. We have made considerable use of the production outlook data contained in this study, especially in relation to regions such as Latin America and Africa, on which systematic data are difficult to find in New Zealand and where the authors' own experience is very limited. However other sources have also been used and the conclusions presented represent the views of the authors, irrespective of their original source.

(c) *Chapters 4 to 7*

The data base for Chapters 4 to 7 is derived from a number of sources. The primary aim was to define for each commodity the size and trend in each country's market, the size of the import components and New Zealand's share in it. For a New Zealand agricultural exporter, concerned with maintaining and/or expanding market share in the immediate future, even basic demographic and economic factors, such as size of population, income level, consumption patterns and domestic supply, are of only secondary interest. Such factors have already determined a country's import market size and will cause it to change in the longer term, but may be regarded as having negligible effect in the short term. However these factors are of primary importance in assessing longer-term prospects, as a basis for the development of marketing strategies.

10. The only single publication series available which gives for main commodities not only import market size but also major countries of origin, is the United Nations' Statistical Office's series on Commodity Trade Statistics (ST/ESA/STAT/SER.D)[40]. In respect of each commodity, if the trade is big enough, or each group of commodities, this series provides information, in both volume and US

dollar terms, concerning the countries of origin of imports to each major import market. The selection of 'major suppliers' in the UNCTS country break-downs allows the listing of New Zealand's market share and that of major competitors in respect of each country/commodity market. Where New Zealand does not figure in UNCTS, the 'NZ share' information has been derived from *Export Statistics 1980–1981* (NZ Department of Statistics)[41].

11. In the 'first run' of the exercise, it was possible to include only 66 countries and only one year's figures in respect of each—these were for the most recent year available—1981 for 36 countries, 1980 for 17, 1979 for three, 1978 for two, 1977 for five and 1976 for three.

12. The age of some of these trade figures—for example 1977 for Iran and 1976 for Iraq—is clearly a problem. For countries and products deemed to be important or significant to New Zealand, attempts will need to be made to establish better and more timely sources of such information for such countries.

13. The UNCTS source does not provide any information at all for some socialist countries, namely USSR, Romania, Democratic People's Republic of Korea, Cuba, China and Vietnam. South Africa and Mozambique are also excluded. For these countries we have obtained equivalent information from New Zealand government sources.

14. A serious shortcoming of the 'initial run' is that the figures pertain to one year only. As a minimum the analysis of each country market should relate to a three-year average. Ideally it should be possible to monitor a ten-year trend. Time constraints prevented us from doing this for each of the 66 countries, but we have partially overcome the problem by analysing three or four years' market share information for the 'most important' countries, i.e. those important enough to have warranted inclusion in the market share analyses in Chapters 4 to 7, on the basis of the one-year figures. The analysis thus reflects 'averaged information', at least for these countries, rather than single-year data. There is however still the possibility that a significant country/commodity market might have been omitted from the analysis on the strength of the initial one-year run.

15. Notwithstanding these difficulties and shortcomings, this market share information is not only useful but essential as an element in systematic market monitoring and strategic planning. The UNCTS is the only single source which currently provides the data required. The alternative—FAO Trade Yearbooks—give annual import size (which can be checked against UNCTS) but not countries of origin. The only other way of obtaining this information is to procure the relevant national trade statistics for each of the 157 countries or at least for those regions and countries thought to be of particular importance.

16. **Longer-term 'Strategic Factors'**
In the longer term (towards 2000), enough time will have elapsed for significant demographic, economic and policy changes in a country to have occurred and to have had an effect on its import demand pattern. 'Static' factors such as population size, income level and nutritional and commodity consumption patterns, and 'dynamic' factors such as population growth, income growth rates and income elasticities of demand for each country, both need to be brought into the analysis. On this basis, we can calculate projected demand for selected commodities in each country in the medium and longer term. It is also possible to project domestic supply for each country/commodity. The net figure gives an estimation of projected 'crude gap' for each country/commodity.

17. It is important to understand that the 'crude gap' is purely an analytical device. In practice, trade flows, consumption or production adjustments and price or policy changes will prevent such a 'gap' from occurring. However the 'crude gap' analysis is useful (though not for seasonal products, e.g. horticulture) as a basis for estimating the degree and the direction of the adjustment which will need to take place. And this in turn provides a useful basis for screening out prospective export market opportunities.

18. **Nutritional Factors**
In ascertaining likely growth in demand for a country/commodity, it is useful* for us to know the dietary pattern of that country's citizens. In particular we should be concerned to monitor protein intake patterns since our major trading interests at present lie in high-protein foods—meat and milk products which accounted for 44% of our 1982 export earnings. We therefore need to know what high-protein food each country is consuming, since this will have a bearing on the evolution of its import demand for our own export commodities. It is more usual to use calorie intake as a measure of a country's nutritional status and to express meat and milk commodities in those terms. However, the factor most likely to drive demand for New Zealand meat and milk products is the nutritional need or demand for protein, not calories. By focusing on protein rather than calories we narrow the range of factors bearing on potential nutritional demand and of competitive commodity supply—eggs, fish, other meats, other milks—to a realistic and workable scale.

19. It can be argued that it is not necessary to focus on nutritional intake patterns since this information is the projected import demand growth figure. It provides a valuable extra dimension to the picture, particularly where our knowledge of the

* but not methodogically essential—see paragraph 19. It is however essential if a marketing strategy is to be based on the analysis.

distribution of incomes, and therefore demand, is very limited. However, we still lack the capability to predict with any degree of confidence the precise income thresholds which are likely to trigger major changes in dietary patterns.

20. Nutritional intake patterns were identified for each country, including total protein intake on a daily per capita basis and the percentage of that intake derived from animal food sources. The sources of that animal protein were then identified, including the relative contributions of meat, milk and other animal products (eggs, fish and animal oils). Two sources were available. The most recent is the 1981 FAO *Production Year Book* (table 98)[39] which provides information on a quantitative basis (annual per capita consumption expressed in kilograms) and as a percentage contribution to total protein intake for a three-year average centered on 1979. The alternative source, the 1980 FAO publication, *Food Balance Sheets (1975–77 Average) and Per Capita Food Supplies (1961–65 Average, 1967–77)*[42] provides more detailed but less up-to-date information, the latest year available being 1977. A comparison of the two publications showed a consistent relationship among countries in terms of total protein intake, a slight increase generally in total intake over the two-year period, and a comparable breakdown between the two years over the animal protein contribution to total intake. We therefore concluded that the figures were comparable with those in the more recent publication and were adequate for working purposes.

21. **Commodity Consumption Patterns—Current Eating Habits**
Just as a knowledge of nutritional intake patterns enhances our understanding of trends in import demand, so a more detailed knowledge of meat and milk consumption patterns is similarly useful. It was necessary to calculate each country's annual per capita consumption for a three-year average centered on 1976 for all meats (beef and veal, buffalo, sheepmeats, goat, pork, poultry, horse and other, including game). The source was the 1980 FAO Food Balance Sheets[42]. In each case the kilogram weight of carcass meat and offal meat was calculated and then added to obtain total meat consumption.

22. The consumption pattern for milk and milk products was analysed from the same source, both for cows and other animals (buffalo, sheep, goat and camel). Because of the complex interrelationships between milk products, this exercise caused some difficulties. The FAO Food Balance Sheets give detailed information relating to the milk process flow. The first entry is the initial production input (in this case numbers of lactating animals) and production output (weight of fresh whole milk in tonnes) followed by imports, stock changes and exports (of fresh whole milk in tonnes). This allows the calculation of domestic supply of fresh whole milk in tonnes. The next columns record the domestic utilisa-

tion of that supply—whether for animal feed, for manufacture (edible and inedible separately identified), for waste, or for direct consumption. The direct consumption figure is then divided by the country's average population for the three years 1975–77 to obtain per capita consumption of fresh whole milk.

23. Calculation of milk product consumption is a complex exercise because it requires some knowledge of milk processing technology. The domestic utilisation figure for edible manufacture is then carried down in the Food Balance Sheet and divided up in the input column of each milk product, still expressed in fresh whole milk (Kg). This reflects the various processes—either for direct processing (for evaporated, condensed or dried milk), culturation (for cheese), or separation (into liquid skim-milk and cream for butter manufacture). The inputs for these items in the Food Balance Sheets add up to the edible manufacture figure under 'domestic utilisation'.

24. Then for each process, a separate conversion factor is used by FAO for each product and each country to transform the production input (in fresh whole milk, MT) to production output (for example cheese or dried whole milk, MT). The exercise is then repeated for each milk product, i.e. imports (of cheese), stock changes, exports, and a calculation of domestic supply. In the case of the separation process, a further identical step in the exercise is necessary using different conversion factors, to proceed from liquid skim-milk to skim-milk powder and whey powder, and from cream to butter and butter-milk powder. In each case, however, the exercise is followed through in identical manner until per capita consumption of that particular milk product is calculated. In all cases, moreover, it is theoretically possible to balance statistically the total milk process for each country, from the number of lactating animals through domestic and external supply and utilisation, to the final per capita consumption of each milk product.

25. In practice, some anomalies seem to emerge from the FAO Balance Sheets. To take the case of New Zealand (pp.677–81), although the conversion figures (22% per whole cow milk/evaporated, 12% whole cow milk/WMP, 94% whole cow milk/liquid skim, 10% cow skim/SMP, 10% cow butter-milk /dried, 16% cow milk/cheese) seemed reasonable, these did not correlate accurately with the actual input figures. In the case of many other countries the conversion factors used were not fully consistent with our understanding (and that of the New Zealand Dairy Board technologists) of the coefficients associated with established milk processing technology. For example, the conversion ratios for cow fresh whole milk separated into cream and liquid skim in many cases totalled 104 or 106% instead of the expected 100%. This anomaly was evident only in large milk-producing countries, mainly West European, where cream production was important enough

to figure on the Balance Sheets. We were unable to resolve this difficulty.

26. For analytical purposes the consumption of each milk product was listed separately. To establish overall demand and supply projections, aggregate consumption was calculated by converting each product back to whole milk equivalents using the inverse of FAO's conversion factors.

27. **Longer-term Market Growth Analysis**
The aim is to project, on the basis of current or predicted trends, the growth in import demand for food products derived from those agricultural raw materials or intermediate products which currently generate the major part of our export earnings, namely beef and veal, sheepmeats, whole milk, butter and cheese. The year 2000, 16 years out, is selected to give us a longer-term picture. The difference between projected demand and projected domestic supply is the so-called 'crude gap', the trend in the 'crude gap' figure indicating either growth of import demand or growth of surplus (export) supply. A number of assumptions and calculations underlie each of these projections, and these are considered in turn.

28. **Demand Projections**
The basic factors that will determine future aggregate demand for a commodity in any country are population size, population growth rate, income growth rate, per capita consumption of that commodity in a given base year, the income elasticity of demand coefficient for that commodity and overall distribution of income and consumption. (The static income level of a country is a determinant of consumption in the base year. It is thus not an explicit factor in the demand growth calculation but rather is incorporated in the equation through its influence on base consumption, income growth rate, and elasticity coefficient.)

29. The income elasticity of demand is measure of the proportion of additional income that will be spent on a commodity. When expressed as a coefficient, it is the percentage of extra expenditure on a commodity for every 1% increase in income. If the coefficient is greater than 1, then more than a proportionate increase in expenditure from a given income rise will result. If it is positive, but between zero and 1, then an income rise will result in an absolute increase in expenditure, but relatively less than that on other expenditure items, i.e. there will be a relative switch in expenditure away from the commodity. If the coefficient is negative i.e. less than zero, then not only will there be a relative switch away, but the actual absolute amount of expenditure on that commodity will decrease.

30. FAO has a descriptive classification for commodities, according to the above three categories, as follows:
(a) inferior goods—the consumption of which declines both absolutely and relatively to income as income rises (negative elasticity);

(b) necessities—the consumption of which declines only relatively as income rises (the value of elasticities in this case ranges from 0 to 1);
(c) luxuries—the consumption of which increases both relatively and absolutely as income rises (elasticity higher than 1).

31. The mathematical function appropriate for calculating an elasticity coefficient varies between countries, between commodities, and between time periods. The factors determining the choice of function are, *inter alia*, population size, income level and level of demand for the commodity. The alternative functions are double-log, semi-log, log-inverse, and log-log-inverse. The choice of function is sensitive to even slight variations in the determining factors. For example, even within one country and for one time period, different functions may be used for different but closely related commodities such as beef/veal and mutton/lamb. The economic theory behind the choice of function, however, is not directly relevant to our study, since we have simply transcribed whatever coefficient arises from FAO's choice of function and resulting computations*.

32. Using the factors of population base, projected population growth rate, per capita consumption in base year, projected income growth rate, and income point-elasticity coefficient for the base year, it is possible to project aggregate demand for each country/commodity for a selected future year. The equation used for this is:

$$C = \left(1 + \frac{B.E.}{100}\right)\left(1 + \frac{A}{100}\right)^{n} c^{1}.D$$

where C = projected aggregate demand in a selected future year
B = average annual income growth rate
E = income elasticity of demand coefficient for the base year
A = projected average annual population growth rate
n = number of years from base year to selected future year
c^1 = per capita consumption in base year
D = population in base year.

33. In this equation C is the projected aggregate-demand for a country /commodity for a selected year. We have selected the year 2000. The reason for this choice relates to the considerations outlined in paragraphs 14–16. We have drawn the distinction between the short term (when New Zealand exporters and policy-makers do not have to focus on factors other than base factors already given in 1984-market size and New Zealand share thereof), and the longer term (when underlying shifts will have had a significant effect on demand determinants). In our view, it is reasonable to assume that basic determinants of demand will remain relatively constant for a period of five years at a maximum. Thereafter, we can no longer disregard the continuous effect of

* For a fuller explanation of methodology involved, see reference [43] Volume II, Part I, pp xxxiii—Liv.

dynamic factors affecting demand in a country. This is the basis for our distinction between short-term and long-term prospects, but in selecting the period to 2000 for the longer-term analysis, we have sought to relate the structure as closely as possible to practical marketing considerations.

34. The most important task, and the one that has been the most difficult and time-consuming, was to determine the best set of data to employ for the projections. The original data available to us were as follows:

(a) *Population*: mid-1981 population as base year (Source: *1983 World Bank Atlas*[37])

Population Growth Rate: projections 1980–2000 (Source, *1983 World Development Report*[44], Table 29, pp.184–5)

For 29 countries no projections were available, and the average annual growth rate for the decade 1970–80 was used instead (Source, *1983 World Bank Atlas*[37]).

(b) *Income Growth Rate*: The World Bank was unable to make available to us its economic growth forecasts for each country on the grounds that the data "is often incomplete, contentious, or provided on a confidential basis", and in the Bank's view was unsuitable for publication. The alternative was to take the average annual compound GNP per capita growth rate for each country for the period 1970–80 (Source, *1983 World Bank Atlas*[37]).

(c) *Per Capita Commodity Consumption*: The source figure was 1975–77 three-year average, centred on 1976 (Source, 1980 FAO Food Balance Sheet). This figure can then be projected to a 1981 per capita consumption figure in order to provide a 1981 base-year equivalent to the factors D, A, and B. The equation for this is:

$$C^1 = C^2 \left(1 + \frac{BE}{100}\right)^n$$

where C1 = projected 1981 per capita consumption

C2 = 1975–1977 average annual per capita consumption

B = average annual income growth rate, 1970–80

E = income elasticity of demand relevant for projecting from 1976

n = 5 (1981–1976)

(d) *Income Elasticity of Demand Coefficient*: The latest published complete set of coefficients are those in FAO's third projection series (see paragraph 31), published in 1971 and relating to survey data of the 1960s. The shortcomings of using elasticities derived in the 1960s for projections from the 1980s to the 1990s prompted us to approach FAO for more recent source data.

35. FAO has published four series of Agricultural Commodity Projections:

(i) *Projections for 1970, Special Supplement for the FAO Commodity Review* (published in 1962)[45]

(ii) *FAO Agricultural Commodities-Projections for 1975 and 1985* (CCP 67/3 Rev., two volumes published in 1967)[46]

(iii) *Agricultural Commodity Projections 1970–80* (CCP 71/20, two volumes published in 1971)[43], and

(iv) *Agricultural Commodity Projections 1975–85* (FAO Economic and Social Development Series No. 16, published in 1979)[10]. Associated with the 1979 publication is the report *Agriculture Towards 2000* (published in 1981)[2]. These two studies have distinct objectives but share some assumptions and use the same demand methodology.

36. Each succeeding publication has compiled a fuller data base relating to income elasticity of demand coefficients for the major food commodities for each country. The 1971 publication[43], however, was the only one to include a complete list of elasticities for each of the (132) countries by each of the (59) commodities or commodity groups. The 1979/81 publications[10][2] give only regional demand figures, but we have procured from FAO the parameters used in its calculations and the results. Specifically the information provided by FAO comprises for each of the (139) countries and (62) commodities or groups:

Table 1: population, per capita and aggregate demand projections for 1975 base year, and projections for 1980, 1985, 1990, 1995 and 2000.

Table 2: indices of demand projected for the same five-yearly intervals.

Table 3: nutrient values projected.

Table 4: farm values projected.

Table 5: parameters of the demand functions (elasticity coefficients).

Table 6: level of demand projected.

37. Three sets of Tables 1–6 are provided, reflecting different assumptions made as to future trends of income and commodity expenditure: the basic assumption, and supplementary and normative assumptions. (Each depicts higher growth respectively while population projections are common for each assumption.) Discussion with FAO confirms that if a single set of projections is to be selected, the basic assumption is the most appropriate.

38. The one factor not provided in the FAO microfiche but which would have been employed in FAO's projection calculations was projected income (GNP per capita) growth rate. Since this was the only remaining variable, however, it was possible to derive it in each case from the projection model in paragraph 32.

39. Having thus obtained or derived the complete data used by FAO in its latest projections, a basic option became available to us. We could either use the full set of FAO workings, dated 1979 and based on 1975 data, and FAO's consequent projection results; or we could calculate our own projections using more recent data wherever relevant. The essential differences would be as follows:

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FAO Projections 1979	*NZPC Projections 1983*
Population—base year 1975	Base year 1981
Population growth—1975–2000	1980–2000
Income growth rate (derived—1979)	Same
Consumption per capita—1975	either same, or 1976 (FAO Balance Sheet)
Elasticity Coefficient 1975–2000 at five-yearly intervals	Same

40. FAO itself has noted that, because its data base is 1975 "some caution is therefore required in their continued use". It is preparing new projections, the source data for which may be available in 1984*. Meanwhile, it was a matter for decision whether to rely on FAO's coherent set of work or to try to update it with newer population figures from the World Bank, and perhaps the alternative FAO per capita consumption figure. In fact, the population discrepancies were modest: taking Indonesia as an example, the alternative figures for 1981 base year are 158,354,000 and 150,000,000 and the population growth rate 2.25% and 2.0%. The resulting discrepancy in aggregate demand for Indonesian sheepmeat consumption in 2000 is significant though not large at 10.6% (286,993 and 259,497 tonnes). A much bigger and more puzzling discrepancy is the alternative, and apparently inconsistent, figures offered by FAO for per capita consumption. The FAO Food Balance Sheet published in 1980 shows average annual per capita Indonesian consumption of sheepmeats for 1975–1977 at 0.1 Kg while the FAO microfiche for the global food demand model shows the 1975 consumption at 0.3 Kg. Nor is the discrepancy explained through decimal rounding since the corresponding aggregate figures for Indonesia are 20,000 tonnes and 39,000 tonnes respectively, a differential factor of 2. Using the Balance Sheet figure in the projection (in fact the 1981 equivalent as in paragraph 32, which is 0.14 Kg) gives an aggregate demand figure for 2000 of 125,559 tonnes, a discrepancy of 129% which is disturbing.

41. On balance, it was judged best to keep to a single, complete and coherent series of data, and for that reason we have used the full demand model of FAO. The main reason for this was that the primary aim of the exercise is less to determine the actual quantitative growth figure with precision (an impossible task in any event) than to identify trends and relativities among markets. The stress on relativity increases the

* The essence of this study is to have a framework constructed which can receive new information as it comes to hand from one year to another. The work—and the corresponding market assessments—should be improved by entering the 1984 FAO data as soon as possible.

importance of using a set of data that is internally consistent. We have therefore used the FAO food demand model aggregate projections (basic assumption) for the years 1985 and 2000. Projected demand growth in the longer term is the difference between projections for 1985 and 2000.

42. **Domestic Supply Projections**
The projection of trends in domestic supplies is at this stage unsatisfactory. With the data and resources available to us, the only possible method, for the immediate purposes of the current project, was to undertake a basic extrapolation of domestic supply, taking the most recent base year (either average 1979/81 or 1981) and the average annual growth rate for the past decade (1970–80). These are extrapolated to the year 2000 using the equation:

$$S^1 = S\,(1 + \frac{i}{100})^n$$

where S^1 = domestic supply in the year of projection
S = domestic supply in the base year
i = average annual growth rate of domestic supply
n = number of years from base year to year of projection

43. To calculate growth in domestic supply comparable with that in demand, we have extrapolated the same trend to 1985 and calculated the growth in the long term (1985–2000).

44. It must be stressed that the supply projections should only be regarded as a first approximation for illustration purposes. Refining these projections should be a major element in an on-going strategic planning exercise. Extrapolating the past decade's growth over the next two decades takes no account of the suitability of the base period, ultimate physical constraints such as land, manpower and environment, cyclical production patterns, or changes in national policies or prices. As a consequence we find projected trends which are not always reflected adequately in a single decade (for example, a 7.26% per annum growth rate for Pakistan sheepmeat production) which result in levels of production by the year 2000 which are unlikely or even impossible given the above constraints. Equally, large negative growth rates experienced between 1970 and 1980, such as 5.37% per annum for United States sheepmeat production and 13.7% for Lebanon beef production, are also unlikely to be maintained for two further decades.

45. These difficulties are clearly illustrated in the FAO supply projections. In 1978/1979 FAO projected supply for 1985 for countries/commodities, using as a data base the annual average production for 1972–1974. These 1985 projections were compared with our own basic 1985 projections using the above method. Considerable discrepancies were apparent. In sheepmeats, for example, FAO's projection for China was 77% above our projection of 426,000 (based on 1981 supply figure of 405,000) and for USSR it was 39%

higher. In fact FAO projections were higher than ours for most developing countries but lower for most developed countries. Indeed many developed countries have already produced more in 1981 than FAO projected for 1985. It is clear that in general, developed countries produced more, and developing countries less, than FAO projected (see also paragraphs 61 and 62).

46. In order to become useful as a basis for the formulation of longer-term market strategies, each of these supply projections requires review and reassessment based on detailed and expert knowledge of the country and commodity involved. Since such an input for each country and each commodity involved was clearly beyond our resources, it was considered best to retain a uniform and objective methodology in the extrapolations themselves, but to relax the methodological constraints and introduce a more subjective but hopefully more realistic element in the interpretative text of the report itself.

47. **Growth in Projected Crude Gap (GPCG)**
Having calculated projected supply and projected demand for a commodity in a country for the two years 1985 and 2000, it is possible to calculate the difference of the 'crude gap'. This will be positive where demand exceeds supply or negative where supply exceeds demand. A comparison of the two selected years (i.e. subtracting the 1985 figures from the 2000 figures) gives us growth figures for each of the three elements—i.e. growth in projected aggregate demand, growth in projected domestic supply and the trend in projected crude gap.

48. For easier comprehension of the statistic, the growth in projected crude gap (GPCG) figure is re-expressed in terms of 100 tonnes, and each country's GPCG is re-expressed in terms of its positive or negative contribution to that net global figure of 100 tonnes. This figure resembles a 'percentage share' but is not strictly such since some countries give a negative contribution while others give a positive contribution.

49. The concept of growth in projected crude gap is central to, and a critical element in, this analysis. It focuses on the changes likely to occur in import markets and amongst competing suppliers throughout the world over the next 15 years in those commodities and countries most relevant to our export trade. It does not tell us which markets (countries) are likely to offer the most dynamic growth in demand for imports of meat and milk products, or which countries are likely to be our competitors. It does however provide us with a technique for screening out markets of little potential interest and for focusing attention on markets in which likely trends suggest the possibility of a growing export market or growing competition, for more detailed investigation. Such investigations in turn provide a basis for establishing priorities and commissioning the market research and

product development activities needed in order to identify and meet consumer requirements five or ten or 15 years into the future.

50. The analyses of longer-term market growth in Chapters 4–7 simply extract the most significant countries—both 'positive' and 'negative' contributors to the global GPCG—from the calculated GPCG 'percentiles'.

51. **Treatment of Specific Commodities; Longer-term Strategic Growth** The analysis of longer-term strategic growth differs significantly from one commodity to another included in the study. There are essentially three broad commodity categories:
(a) those commodities for which a 'crude gap' analysis is appropriate and for which adequate data are or should be available, e.g. meat and dairy products;
(b) those products for which a crude gap analysis is appropriate but for which global data were inadequate or unavailable in a suitable form e.g. wool;
(c) those products for which, because of the nature of the market, a 'crude gap' analysis is less useful, e.g. most horticultural products.

In the longer term, it is important that we develop a capability for monitoring and making systematic market forecasts, with reasonable confidence, for all markets for all products in which New Zealand has an existing or potential export interest.

52. The two meat commodities presented no particular theoretical difficulties. The shortcomings in the analysis are due mainly to lack of resources. However some conceptual complications were encountered in matching demand and supply projections for milk products. It had been our intention to calculate separate projections for each of the four main milk products—butter, cheese, wholemilk powder and skim-milk powder. FAO production data allows such separate supply projections. It also permits calculation of separate demand projections for butter, cheese, skim-milk powder and wholemilk powder. An alternative method would have involved the use of FAO microfiche data to develop demand projections for each milk product. Separate projections are given for butter and cheese, and also for 'whole milk' (not powder) and 'skim-milk' (not powder)—these latter two figures being expressed in fluid milk equivalence. However it appeared from an analysis of the data that the 'whole milk' figure in the microfiche data constituted 'residual whole milk', comprising liquid, whole milk, fresh milk products (e.g. yoghurt) and waste, i.e. exclusive of butter, cheese, skim and wholemilk powder. This is of considerable significance to New Zealand because it affects our export prospects for wholemilk powder and skim-milk powder.

53. Thus, two alternative calculations were open to us, and indeed both were undertaken in the course of

the study. First we could calculate separate supply and demand projections for butter, cheese and 'residual whole milk'. In the case of 'residual whole milk', we used the demand figure for whole milk in the FAO microfiche. On the supply side, we calculated whole milk equivalence of past butter and cheese production. Then we projected to 1985 and 2000 the production of (i) whole milk (ii) butter and (iii) cheese; and subtracted (ii) and (iii) from (i); the remainder being the projected supply of 'residual whole milk'. Calculating whole milk equivalence of butter and especially cheese was a complicated exercise in itself. We used the inverse of the separate country conversion ratios for milk /butter and milk/cheese from the FAO Food Balance Sheets[42]. In many cases where cheese was derived from a mix of cow, buffalo and goat milk with different conversion factors, we calculated the appropriate weighted average factor. In some cases, cheese was derived from skimmilk which necessitated a two-step calculation using the conversion factors of whole milk/skim and skim/cheese.

54. While the above separate projections for butter, cheese and 'residual whole milk' were undertaken and have been retained, this method of assessing longer-term strategic growth in the milk market was dropped in favour of an alternative approach. That was to calculate a single demand projection of an overall milk market, that subsumes its component products of butter, cheese and 'residual'. Thus, the demand projection for 1985 and 2000 in the FAO microfiche for butter, cheese and 'whole milk' are re-expressed in whole milk equivalence. In this exercise, we chose not to use separate country conversion rates as in paragraph 44, but rather simplified the exercise by using standard FAO conversion rates of 5% for whole milk to butter (i.e. converting back to WM equivalents at 20:1), and 11% for cheese—'whole milk' already being in equivalent form. For each of these two years, they are aggregated into a projected demand for whole milk in total. Supply projections for whole milk were derived from the *FAO Production Yearbook*[39] (i.e. extrapolations to 1985 and 2000 of total whole fresh cow milk production, using 1981 as base year and a decade growth rate of 1969/1971 to 1980–see *1981 FAO Production Yearbook*[39], Table 90). Net projected supply and projected demand for whole milk give the crude gap for the whole milk market in 1985 and 2000 and the growth in this figure between these years gives the GPCG figure for whole milk, re-expressed in 'percentile' terms.

55. Separate projections for separate commodities are less meaningful for milk products than for most commodities, primarily because some of the products—mainly butter and to a lesser extent milk powders—are storable items, while others—fresh milk and cheese—are perishable but have first claim on supply. The actual equilibrium between supply and demand of milk products responds

more to forces affecting related milk products than is the case with meats. It is therefore better to project an aggregated figure and then to give consideration to how total milk supply might be allocated between individual milk products.

56. The methodology used for horticulture—to the extent that projections have been made—is substantially different from that used for meat and milk. The analyses are based on different sources (OECD rather than FAO), relate to a smaller group of countries (OECD countries only), and cover a smaller time period (five years rather than 15 years). For strategic market planning it would be desirable to develop an analytical framework more comparable to that presented for meat and milk. However, for a number of reasons including substitutability and seasonality of demand for specific products, regionalisation of much of the international trade in fresh products, and the structure and mechanisms of the markets concerned, the crude gap approach is less appropriate and a different methodology and different data base are required. Nevertheless the same basic principles involved in using longer-term supply and demand projections as a first step towards identifying potential markets still apply.

57. **The Substitution Effect and Cross Elasticity**
An important consideration in developing national marketing strategies is potential competition from alternative commodities. In the case of our meat exports—beef and veal, mutton and lamb—there is widespread (and justified) popular apprehension over the effect of increasing consumer preference for white meats—poultry and pork—on demand for red meats. This trend is discussed in Chapter 4 and has not been overlooked in compiling the study's projections. The FAO data provides demand projections and allows supply projections for both poultry and pork. It is thus possible to compare the projections of specific white and red meats, both globally and for each country. The projections for white and red meats are not mutually exclusive. The consumption figure for pork in Indonesia in 2000 is not projected at the expense of the corresponding figure for sheepmeats; both are projected to occur together on the assumption of constant price relativity between them. In methodological terms, it can be said that the income elasticity coefficient of sheepmeats in Indonesia (+1.6) is derived from empirical data relating to consumer behaviour in that country in the mid 1970s, which implicitly takes into account consumers' preference for sheepmeat vis-a-vis pork (and all other items of expenditure). A projection for sheepmeats, therefore, takes into account future consumer behaviour towards pork and can therefore be analysed on its own. Likewise the income elasticity coefficient of pork (+0.8) is not relevant to sheepmeats since the assumption of constant price relativity precludes any substitution effect

or cross elasticity effects. At the stage at which it becomes necessary to relax the constant price relativity assumption, it will be necessary to extend the analysis to take into account cross-price elasticities and substitution effects, using the methodological framework described in this study as the starting point.

58. The same considerations apply to the relationship between milk products (butter) and margarine, wool and synthetic fibres and even fruits and other desserts, e.g. ice-cream.

59. **Assumptions, Qualifications and Accuracy**
In this study, we have used FAO data and projections and to this extent we have implicitly accepted FAO's basic methodology. We have not sought to add in any way to FAO methodology. The main relevant aspects of this methodology are as follows:
(i) The projections are not forecasts or targets. They represent judgements of the results to be expected on certain specific assumptions as to policies, prices and population and income growth. No projections are better than the assumptions and data on which they are based.
(ii) The basic assumptions on prices and policies are:
—relative prices will remain constant, i.e. producer and consumer prices of any one agricultural product will remain constant at the level prevailing around the base year relative to the general level of prices in the agricultural sector
—present agricultural policies will remain unchanged
—technology will continue to evolve as in the recent past.

60. This approach therefore assumes that population and income are the major shifters of demand. In the FAO demand model, income (private consumption expenditure) is brought in through the application of pre-selected values of income elasticities and appropriate demand functions, which reflect the way in which demand changes with increased income.

61. To gain an appreciation of the likely measure of accuracy of the demand projections used in this study, we ran a check of past FAO projections on which the methodology was based. Specifically, we selected three commodities—beef/veal, mutton/lamb, and fresh whole milk. In the case of consumption, we took FAO's 1971 series trend projection of per capita demand for the year 1975, aggregated it by FAO's projected population for 1975, to find FAO's projected aggregate demand for 1975. We then took the actual per capita consumption figure for the years 1975–1977 recorded in the FAO Food Balance Sheets, and aggregated it by the actual 1975 population figure, to find (an approximation of) the actual total consumption for 1975. A comparison of these two figures—FAO's 1975 projected aggregate demand and FAO's actual recorded 1975

(approximation) of total consumption for 1975—reveals the degree of accuracy of the 1971 FAO demand projection for 1975. We use the term 'approximation' since the actual per capita consumption figure is for a three-year average centered on 1976, and a discrepancy of one year's growth in per capita consumption (1975 to 1976) should therefore be expected in the results. Thus the consumption figure is expected to be greater than the projection figure by one year, and the expected ratio of actual consumption/projection marginally above 100% for the FAO projections to have been accurate. We selected 24 countries and the results showed that for beef/veal, the ratio averaged 100.7%; for mutton/lamb the ratio averaged 73.3%; and for fresh whole milk, it was 75.4%. In a few cases the projection was greatly astray. Nigeria's actual consumption of milk was 16.7% of the projected figure, and we sought the reasons for this discrepancy. The 1971 FAO projections were based on a 1965 base year per capita consumption figure of 6.2 Kg/year which allowed a projected 1975 figure of 6.0 Kg/year. In fact, the actual percent consumption of fresh whole milk in 1975 was 1.2 Kg/year. The reason for this discrepancy could have been the turbulence associated with the Biafran Civil War in the late 1960s. This would simply underline the general conclusion that projections are extrapolations of existing trends and policies; they do not accommodate unexpected or cataclysmic events. The major more recent unforeseen event likely to have influenced demand and projected demand for agricultural products has been the general economic recession and in particular the debt problems being encountered in a number of newly industrialised and middle-income countries in which dynamic demand growth had been predicted. Nevertheless, though as a consequence tending to err on the high side, and although based on data which is now well out of date, we feel that the demand projections give a useful overall indication of likely trends.

62. In the case of production, the comparison involves a simpler exercise. For the same countries/commodities, but for the year 1980, we have compared FAO's 1971 projections of 1980 production (Ref. 43, Vol I, pp 71, 77–78, 79–80) with the actual production subsequently recorded by FAO (1981 *FAO Production Yearbook* Tables 83, 85 and 90)[39]. The ratio of actual projection was 74% for beef/veal, 45% for mutton /lamb, and 89% for fresh whole milk. FAO's production projections, like most production forecasts, are less reliable than its consumption projections, actual production being considerably less than FAO's expectations. In the case of mutton/lamb, actual production was below half of that expected. This simply underlines the need for New Zealand, an exporting country, to ensure that appropriate efforts and resources are allocated to the development of more technical supply forecasts and projections as a basis for strategic market planning.

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Appendix III The Nutritional Componentry of Milk and Product Options Available to the Market

The Components of Milk

Milk is one of the most nutritious and versatile sources of food. It is composed mainly of water with smaller amounts of fat and non-fat solids. The precise mix depends on the breed of cow, the method of feeding and the standard of herd management. In New Zealand, where the dairy cattle milk is produced from Jersey or Friesian herds fed exclusively on grassland, it is composed on average of 4.7% fat, 9% solid non-fat (being 3% protein, 5% lactose and 1% minor elements) and 86.3% water.

Processing Options

Basically, three processing choices are open to us: our whole milk can be processed directly, it can be cultured or it can be separated. The first process involves the treatment of the whole milk in its essential form. The second allows the growth of micro-organisms in the whole milk. The third separates the fat (cream) from the non-fat (protein and lactose) and then processes each into different commodities and products.

Direct Processing

Direct processing will produce homogenised and sterilised liquid milk, evaporated milk, condensed milk, wholemilk powder, concentrated whole milk for ice-cream manufacture and more recently UHT milk (ultra-high temperature milk).

The liquid milk is consumed domestically through our town milk supply. Evaporated milk (otherwise known as unsweetened condensed milk) is liquid milk with about 60% of the water extracted.

Condensed milk is liquid milk with a very high (44%) added-sugar content.

Wholemilk powder is whole milk with the entire water content and a minor amount of fat extracted, thus reduced to powder form.

Cultivation

Cultivation will produce cheese or yoghurt. Whey is a liquid residue of cheese manufacture and developments in milk technology have allowed the further utilisation of whey from cheese than before.

Separation

Separation of whole milk by centrifuge process will produce cream and skim-milk.

Fat

The cream is composed of solid milk fat and can be processed into ice-cream (although this method is rare in New Zealand) or butter fat products. These latter are butter, anhydrous milk fat (AMF) or ghee. In addition to each of these, butter-milk powder will also result.

Butter is essentially the fat of the whole milk. Anhydrous milk fat and ghee are butter oils in solid form: ghee is of a lesser quality.

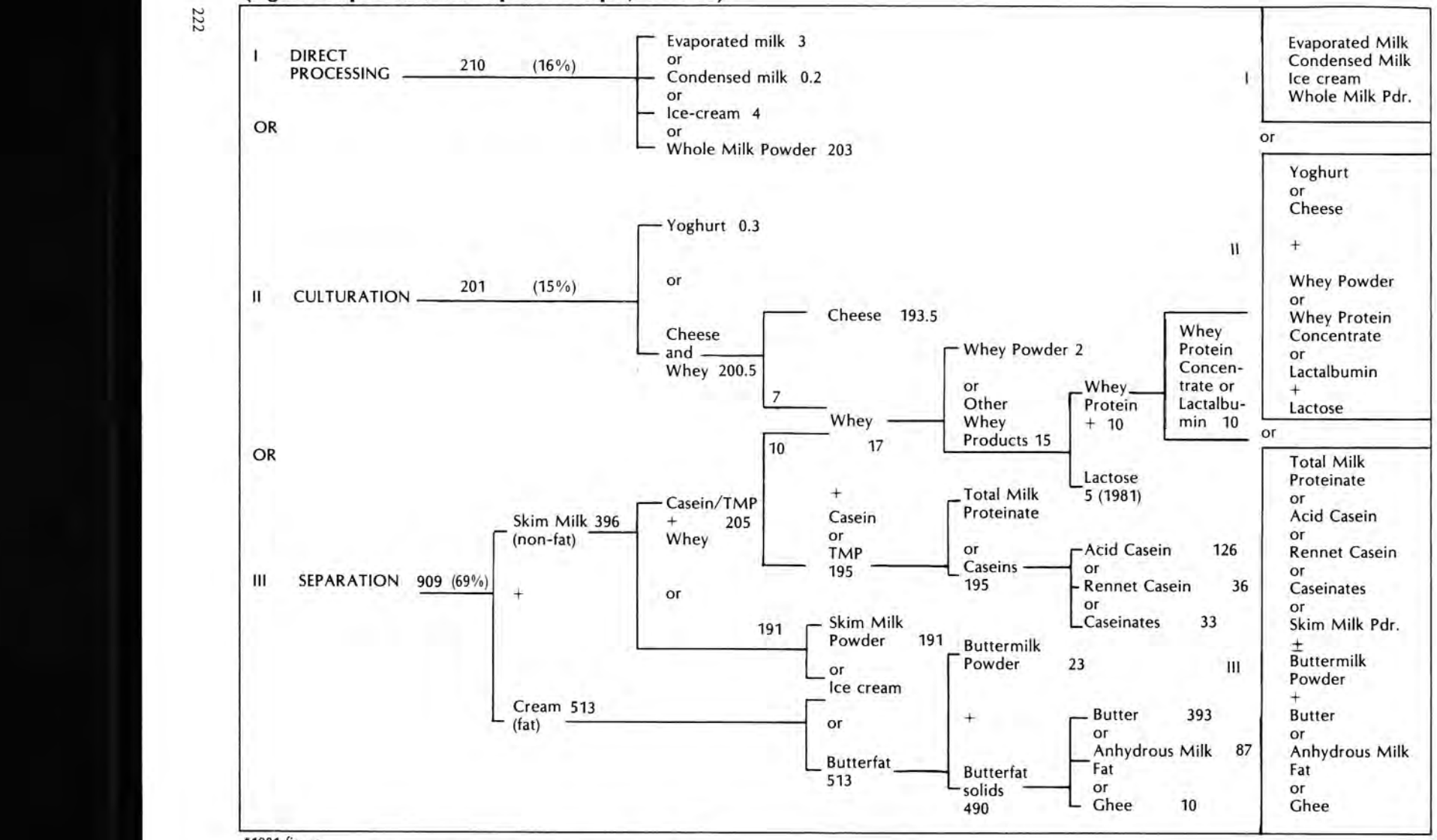
Butter-milk is a by-product of the production of lactic butter from fermented cream. Butter-milk powder is butter-milk with the liquid content extracted.

Non-Fat

Skim-milk is composed of lactose and proteins (the casein protein and the two whey proteins, lactalbumin and lactoglobulin). Three options are open to the processing of skim-milk: it can be used as a base for ice-cream manufacture,

Milk and Milk Products: Processing Options for Export

(Figures depict NZ$ fob Export Receipts, 1982–83)



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Source: Department of Statistics, *Exports Annual,* Volume 1982–83

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although this process also is rare in New Zealand; the water can be extracted and skim-milk powder (SMP) results; or casein or caseinates can be extracted. This can be done either by acidification which yields acid casein or by coagulation with rennet which yields rennet casein.

Whey

Whey is a by-product also of casein manufacture. Whey is collected as a liquid residue from the manufacture of either cheese or of casein (in New Zealand in the ratio of about 60:40). Whey is composed of 94% water, 1% lactose and 5% whey proteins. This can either be reduced to whey powder or it can be further processed to extract the lactose or the lactalbumin protein. Lactalbumin is a more sophisticated milk protein than casein because of its higher amino acid lysine content. It is therefore a useful protein supplement for cereal products which are not rich in lysine. It is also useful for improving flavour in sausages, luncheon sausage and other smallgoods. Lactose, being essentially milksugar, has direct energy uses. The lactose from our milk produces all our domestic requirements of ethanol, applied to the production of methylated spirits as an industrial solvent and as a potable ingredient for fortifying gin and vodka. For our export sales however, it is used for edible purposes—in infant foods, pharmaceuticals, medicinal tablets and as a medicinal extender. These processes have been established for decades and these items sold abroad, but even today only about a third of our whey is processed. The rest is used in spray irrigation or in animal feed. Environmental concerns have terminated the practice of disposing of whey into drains.

Modern Milk Technology

Developments in milk technology in recent years have opened up potentially valuable opportunities for further commodity utilisation of our milk. These relate mainly to the uses of casein and whey. The further processing of sodium and calcium caseinates has opened up new areas of use in the food manufacture line. New opportunities in particular are being created for whey: an ultrafiltration process has in the past few years allowed the two whey proteins to be extracted in natural state, resulting in a whey protein concentrate and in the most recent development it is now possible to recover the full protein content from skim-milk in a commodity form known as 'total milk proteinate'. This is a spray-dried flavour-reduced soluble sodium powder in which casein and whey proteins are isolated in a single protein complex from fresh skim-milk. It can be used for meat emulsions, health foods and nutritional supplements, bakery products, coffee whiteners and whipped toppings. Finally research is continuing in the extraction of ethanol from lactose to determine whether it can be developed commercially to meet some of our energy requirements. A major constraint on the more widespread processing of whey however is the capital intensive nature of the technolology and the high recurrent production cost compared with existing market return.

Commodity and Product Choices

The overall pattern of processing options clearly allows a great range of commodity and product choice. This is depicted in the chart. Many of the options, including the three basic options, are exclusive of one another, while others are comple-

mentary. A greater volume of milk processed by separation for certain commodities and products will mean a smaller volume processed by culturation or by direct processing. For example, wholemilk powder will be processed and marketed overseas at the expense of cheese, and cheese at the expense of butter. Butter, however, is not produced and sold at the expense of skim-milk powder, but in addition to it. But skim-milk powder (though not butter) is produced at the expense of casein (though not casein at the expense of whey).

An Optimal Mix

Given the process options, it is necessary for us to determine the optimal mix of commodities that will provide the best financial return to us. This requires a complex consideration of many factors. In the first place different quantities of each commodity/product are derived from a given quantity of milk, so there exists from the outset a fixed constraint on the opportunity factor in the decision process. Over and above this, judgements are required of commercial factors such as short and long-term market security and opportunity; price trends in response to changes in demand; changes in protectionist barriers overseas in response to foreign supply levels; and production, processing and transport cost factors at home.

Complicating the Decision

Because of the product mix relationships, there will also be a constraint on the flexibility with which a policy-maker can switch products in response to changes in demand and price. If demand or unit prices increase for wholemilk powder relative to cultured or separated products, then this will, other things being equal, have a negative effect on the quantities of cheese, casein, SMP and butter we might choose to produce that year. But if SMP prices increase, this would have a negative effect on our volumes of WMP, cheese and casein, but a potentially positive effect on our quantities of butter or butter oils and our butter-milk insofar as there will be greater butter fat available for processing. It may be that the international market prospects for our butter fat product do not warrant increased supplies of these items at that time which would give rise to conflicting considerations in judging the product mix. A further complicating factor is that a single international market situation for any one product is only a notional concept, and in fact demand and prices for a product differ among markets and may well trend in opposite directions. So the overall judgement is a very complex matter.

Simplifying Guidelines

Such judgements and a flexible policy plan are in fact made by our dairy product marketing people in the course of each year. Because of the complexities involved, some simplifying assumptions are made. As a broad guideline, the policy each year is to process a product mix that comprises a 70% base load (i.e the basic commodities/products of cheese and butter plus SMP or casein). The remaining 30% is open to process and product switching as our perception of the market might dictate.

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