

South Australian Agriculture

DAIRYING



DEPARTMENT OF AGRICULTURE
SOUTH AUSTRALIA

January, 1992

DAIRY

COMMODITY PLAN

FOREWORD

This strategic plan is one of a series which has been developed for the principal South Australian agricultural industries and the services provided by the Department of Agriculture.

Agriculture contributes a greater proportion of returns to the State's economy than that of virtually any other state in Australia. It is therefore important to review the potential for the further development of agriculture in South Australia. These plans have been prepared by the staff of the Department of Agriculture in association with representatives of the respective agricultural industries and farmer organisations. The aim has been to identify the production potential and the market potential for the respective commodities and to thereby evaluate the opportunity which the state has to further develop its agricultural industries. At the same time, consideration has been given to identifying the most important issues to be addressed in the coming years to enable the state to achieve its maximum economic potential from agriculture. These plans will be valuable for determining the future provision of services to the rural community.

I should like to acknowledge the hard work and creative thought which both departmental staff and participants from industry and the farming community have put into the preparation of these plans.



(John C Radcliffe)

DIRECTOR-GENERAL OF AGRICULTURE

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1. EXECUTIVE SUMMARY

1.1 Industry Statement

In 1988/89 the gross value of processed dairy products in South Australia was \$175 million with the gross value of milk at the farm level, \$93 million. South Australian dairy farmers produced 356 million litres of milk were produced by 89,000 cows on 988 dairy farms. The number of dairy farms is declining whilst milk production has remained relatively constant since 1984. This is consistent with the rest of Australia.

The major dairying regions in South Australia are the Metropolitan Milk Production Area (Adelaide Hills, Lower Murray) the South East and the Mid North. South Australia is the fourth largest producing state, accounting for 5.7 percent of the milk produced. In 1989 production per cow was the highest of all States at 3 978 litres.

Approximately 35 percent of South Australia's milk production is used for liquid white (market) milk and 45 percent for cheese manufacture with cheddar being the major variety. The remaining milk is made into flavoured milk, cream, icecream, butter, custard, yoghurt, cultured buttermilk, cultured cream and dairy desserts (ie Fruche). Four companies, two propriety and two co-operatives operate 12 large factories throughout the State which produce the bulk of the processed product. In addition there are several small factories producing product for specialised markets. South Australian dairy exports were worth \$11.6 million for 1988/89. (ABS)

1.2 Industry Potential

World markets are corrupted by overseas government policy which influence the South Australian operation. In recent times the South Australian processors have led the way in diversifying into fresh products (custard, yoghurt, Fruche etc) for the domestic market. This has lead to greater stability for both companies and farmers. Future market opportunities are in additional value added dairy products that are seen as nutritious, pure and wholesome by the consumer.

The potential for increased milk production in South Australia will relate directly to the price received by the dairy farmers and the income to be generated from alternative industries. The ready availability of grain and 'cheaper' land in the Mid North, Mallee and Upper South East has potential for dairy feedlot style activities. There is considerable potential for the dairy industry to increase production and efficiency through animal and pasture breeding. It is not inconceivable that in the future a proportion of a dairy farmers income will come from the pharmaceutical uses of colostrum.

1.3 Barriers

Apart from the following specific items there is a need for a combined industry approach between the production and manufacturing sectors.

1. Competent managers
2. Pasture yields
3. Water utilisation
4. Public perception of milk
5. Seasonality of production
6. Dairy farmer attitudes
7. Feed costs
8. Environment
9. Inadequacy of finance
10. Long term industry potential

1.4 Current Departmental Programs

The following is a list of dairy programs currently conducted by the Department in the dairying regions of South Australia.

1. **Pasture Evaluation**

Evaluation of grass and legume species for production, persistence and disease resistance.

2. **Pasture Establishment**

Improvement of establishment, nutrition, management and conservation of pasture.

3. **Reproduction**

Improvement of the efficiency of dairy cattle reproduction and breeding through new reproductive/embryo technology, identification of milk protein genotypes and farm survey data.

4. **Health**

Increased productivity of dairy cattle through improved health status.

5. **Management**

Increased milk production through improved efficiency of feeding and management.

6. **Viability**

Maintain dairy farm viability.

7. **Environment**

Investigation of farm management practices in relation to the environment.

8. **Quality**

Provide resources to maintain quality and variety of dairy produce that is consistent with community health, safety and changing tastes.

9. **Policy**

To provide policy advice on the dairy industry to the South Australian Government.

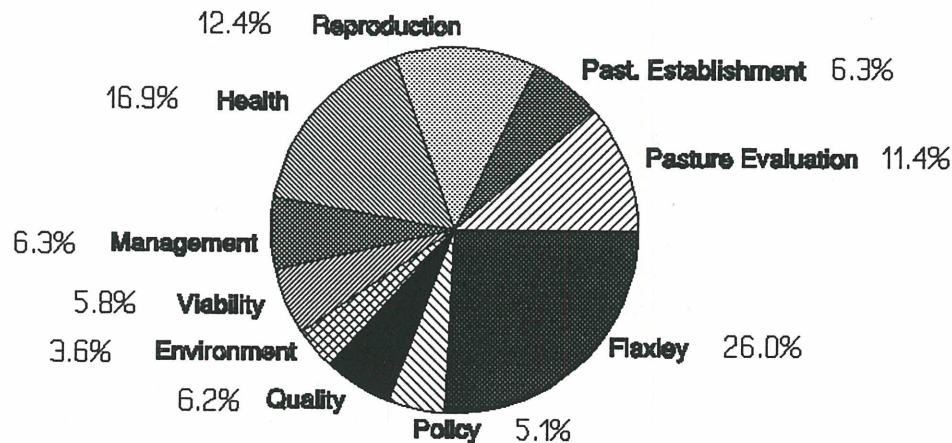
10. **Flaxley**

Research Centre Operations providing resources to all research programs.

1.5 Resources

Figure 1 summaries the State and other resources currently allocated to the 10 current departmental programs.

Figure 1. Allocation of resources by program (\$)



1.5.1 Research

Flaxley Research Centre in the Adelaide Hills is the Department of Agriculture's facility for Dairy and High Rainfall pasture research in South Australia. Flaxley's objectives pertaining to the dairy industry include improving the profitability of pasture-based farming by increasing the productivity of pastures, efficient dairy cattle reproduction and breeding, improved health status and reduced metabolic disorders of dairy cattle and the efficient use of natural resources.

In addition the Central Veterinary Laboratories (VETLAB) conducts research on trace element nutrition; helminthic parasites in dairy cattle, Johnes disease and pestivirus. Northfield Research Laboratories has a medic breeding program, Officers at Murray Bridge District office research irrigation techniques and pastures for dairy farmers and the Northfield Laboratories is investigating the commercialisation of colostrum for pharmaceutical use (Rotavirus). Twenty one FTE's service dairy industry research, excluding rotavirus with an annual expenditure of approximately \$0.7 million (salaries and operating only).

1.5.2 Extension

Regional extension officers are located at Clare, Mt Barker and Victor Harbour (Central Region), Murray Bridge (Murray Lands) and Mt Gambier (South East Region) and are managed by the regions. There are a total of 6 officers providing the equivalent of 4.3 FTE's involved in extension across all departmental programs. Additional resources in Adelaide provide services to the processing industry and information and coordination of state programs for regional advisers (1.7 FTE's). Annual expenditure on extension represents approximately \$253 500 in salaries and operating.

1.5.3 Diagnostic

VETLAB provides diagnostic services to the Department of Agriculture and private veterinary practitioners. Services include isolation and identification of disease causing organisms, monitoring of the antibiotic resistance of such isolates, diagnosis of mineral and trace element deficiencies and investigations into the causes of abortion and infertility. In addition tests for certification for freedom from disease of animals for sale and export are carried out. Five FTE's service the diagnostic sector of the dairy industry with an annual expenditure of \$120 000 in salaries and operating.

1.5.4 Regulation

Regional advisory staff and staff from the Animal Industry Branch, Adelaide provide the equivalent of 0.5 FTE to support regulation in the areas of health and quality. This represents approximately \$52 195 in salaries and operating. Due to the current review of dairy industry legislation expenditure in this area has currently increased \$8 500 (salary only).

1.5.5 Policy

Policy advice on the dairy industry and related issues is given to the South Australian Government and represents an increasing proportion of time allocated. Currently 0.8 FTE is budgeted for direct policy advice at a cost of \$37 352 (salary only).

1.5.6 Total resources

The dairy industry commodity area directly employs 33.3 staff, representing 4.2 percent of departmental staff allocated to research, extension, diagnostic, regulation and policy. In comparison, dairy production comprised 4.1 percent of South Australia's gross value of agricultural production, for 1988-89.

1.6 Outcomes Sought

The dairy industry in five years will consist of some 800 dairy farms milking 90 000 dairy cows producing 450 000 000 litres of milk. This would be supplied to three major manufacturing factories producing speciality cheeses and value added wet products. Market milk will be produced in four factories to cover the whole State.

2. INTRODUCTION

2.1 The Commodity Process

The South Australian Department of Agriculture established Commodity Groups in early 1990. Each Commodity Group was asked to prepare an industry statement and plan for their commodity.

The Dairy commodity plan covers both the production and processing of the commodity looking at farming systems, regulations, market potential and barriers to achievement of industry potential.

Current departmental research, extension and industry services are also outlined.

2.2 Objectives

The objectives of the dairy commodity group are:-

- 1) To identify dairy industry needs and priorities
- 2) To determine the extent to which the Department is meeting these identified needs.
- 3) To advise on appropriate future research and extension programmes.

2.3 Industry Consultation

Consultation with industry has occurred at all stages of the commodity planning process through the Dairy Research and Extension Advisory Committee (DREAC) established to provide a forum for planning between industry and the Department of Agriculture. Company managers, additional farmer representatives, departmental staff and the representative for dairy from the Advisory Board of Agriculture (Mr. Ralph Hurrel) have also had the opportunity to comment on to the Dairy Commodity Plan.

2.4 The Dairy Commodity Group

Dr. Mary Barton, Vetlab
Mr. Brian Bartsch, Flaxley Research Centre
Mr. Kym Jervois, Economics Group
Mr. Hugh McClelland, Agricultural Development & Marketing
Miss Chris Morony, Dairy Section
Mr. Tim Newbery, Dairy Section
Mr. Steve Scown, Murrumbidgee District Office
Dr. Greg Stevens, Flaxley Research Centre

3. INDUSTRY STATEMENT

3.1 Farming Systems

The major dairying regions in SA are the Metropolitan Milk Production Area, (Adelaide Hills, Lower Murray) the South East and the Mid North. There is a small group of dairy farms in the Riverland (Table 1).

Table 1: No. of Dairy Farms and Production in each region

	Metropolitan	South East	Mid North	Riverland	Total
June 1990	662	201	71	5	939
million litres (1989-90)	268	70	18		356

3.1.1 Mid North

The average herd size is 67 cows with a year round calving pattern. Farm size is relatively large with the dairy unit part of a larger cereal operation. Dairy income per cow is lower than the other four major areas. Almost all dairies are dryland relying on an annual rainfall of approximately 450-600 mm.

3.1.2 Central Hills

The area with the smallest farms. Average dairy area is 96 ha with an average herd size of 70 cows. Calving tends to concentrate between March and August. Average dairy income is slightly higher than the Mid North with a significant income from other farming activities. Approximately 80 per cent of the farmers use irrigation although the average area is only 12 ha. Rainfall is 700-900 mm, per annum.

3.1.3 Southern Hills

The Southern Hills area has an average herd size of 93 cows, with the majority of the cows calving in the Autumn. Annual rainfall ranges from 525mm to 1000mm. Approximately 40 percent of dairy farmers use irrigation with an average area of 10 ha. The average dairy area is 118 ha. Farmers in this area rely on dairying for their income.

3.1.4 Lower Murray

The Murray Swamps and Lakes Area is predominantly irrigated as the rainfall is low, ranging from 270-460 mm annually. There are approximately 20 dryland farms around Meningie. The average irrigation area used for dairying is 48 ha with an average herd size of 91. Farm income is mainly from the dairy and generally greater than dairy enterprises in other regions. Calving is increasingly concentrating in the Spring.

3.1.5 South-East

Annual rainfall in the South East region ranges from 500-700 mm. Calving is predominantly in the Autumn. Herds average 95 cows on an average dairy area of 132 ha. Farm income is mainly from the dairy. About 65 per cent of farmers irrigate an average of 20 ha.

Further statistical information, including income and costs on the above dairy areas can be obtained from Appendix 1.

3.2 Production

The number of dairy farms is declining whilst milk production has remained relatively constant since 1984. This is consistent with the rest of Australia. The estimated number of dairy cows (in milk and dry) is 92,000 (5.5 percent) of an Australian total of 1,663,000 (ABS March 1989). South Australia is the fourth largest producing state, accounting for 5.7 per cent of the milk produced. Production per cow in 1989 was the highest of all states at 3,978L (Table 3). The 1988/89 gross value of milk at the farm level was \$93 million and for processed product in SA 175 million dollars.

3.3 Markets and Processing

Whole milk production for South Australia in 1989-90 was 356 million litres with 22 premises licensed to process milk in South Australia. There are four major companies in South Australia. Two, Dairy Vale and Mount Gambier are co-operatives. The other two, Kraft and Farmer's Union Foods are proprietary companies. Mount Gambier Co-op and Kraft utilise the majority of the milk in the South East. Dairy Vale and Farmer's Union utilise milk in the MMB area with Farmer's Union operating in the Mid North and Dairy Vale in the Riverland.

These companies provide direct employment for approximately 1500 people. In addition approximately 400 milk vendors are involved in the retail and wholesale distribution of milk.

3.3.1 Domestic

The amount of milk processed by the major companies in South Australia is shown in Table 2.

Table 2: Major Companies and amount of milk processed in 1989

Company	Farmers Union Foods (FUF & Allowrie)	Dairy Vale Co-op (DV)	Kraft (KFT)	Mt Gambier Co-op
Litres	143 400 947	139 442 281	36 284 091	30 651 342

Approximately 35 per cent of South Australia's milk production is used for market milk and 45 per cent for cheese manufacture. South Australia manufactures 13 per cent of Australia's cheese with cheddar being the major variety. Non-cheddar cheese manufacture has increased from 24 percent in 1985-86 to 40 percent of total cheese production in 1989-90. The remaining milk is made into flavoured milk, cream, ice cream, butter, custard, yoghurt, cultured buttermilk, cultured cream and dairy desserts. (Table 4).

Table 3: Dairy statistics for Australia by State (1989)

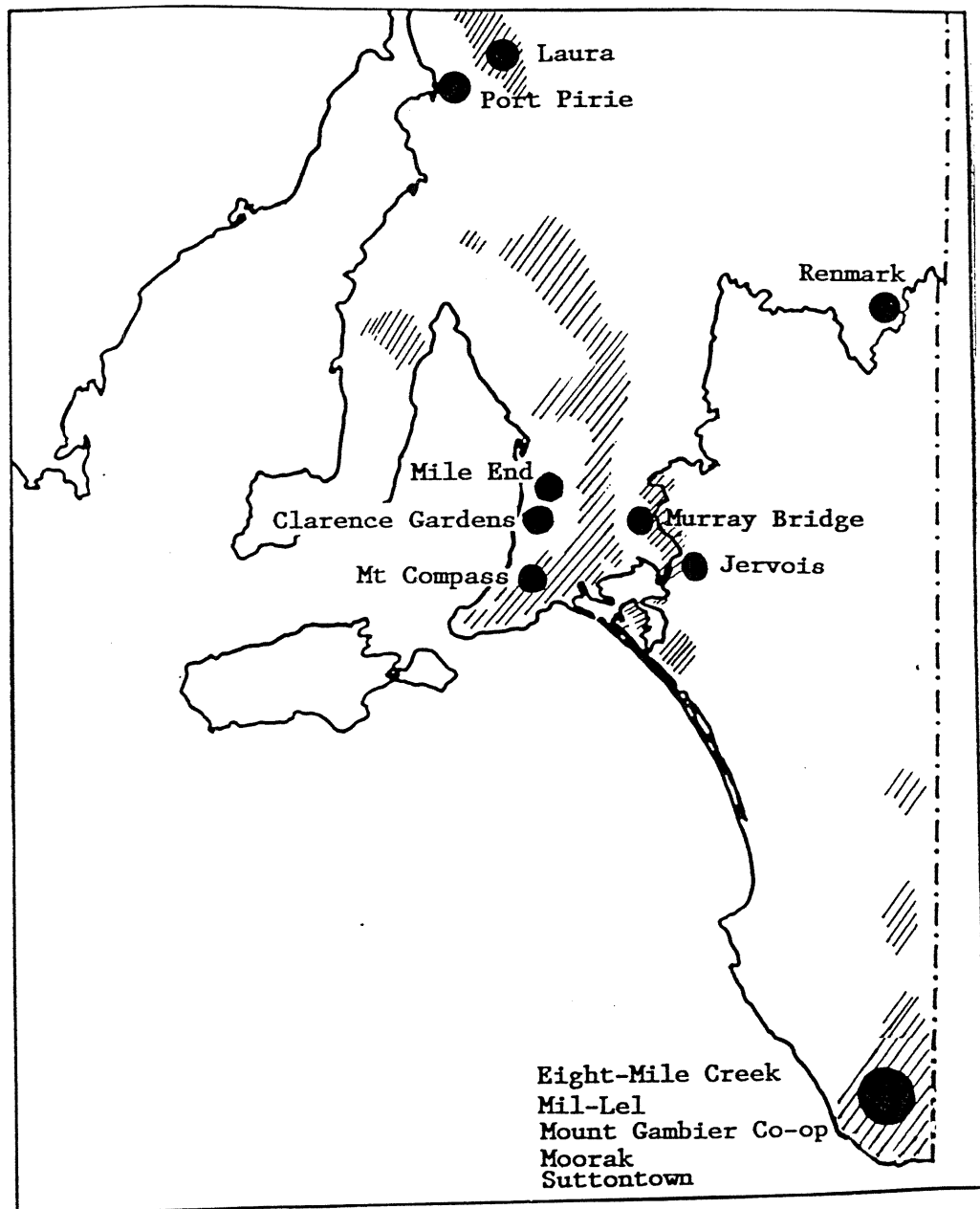
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Table 4: Major factories and type of produce manufactured

Factory	Produce
Port Pirie (FUF)	Market milk
Laura (Allowrie)	Icecream
Mile End (FUF)	Market milk, Flavoured milk, Yoghurt
Clarence Gardens (DV)	Market milk, Flavoured milk, Yoghurt Cheese (Edam, Gouda)
Mt. Compass (DV)	Cheese (Edam, Gouda) Butter
Murray Bridge (Allowrie)	Cheese (Cheddar, Romano Pepato) Fruche
Jervois (DV)	Cheese (Cheddar)
Renmark (DV)	Market Milk, Flavoured milk
Eight Mile Creek (KFT)	Fancy Cheese
Mil Lel (KFT)	Cheese (Cheddar)
Moorak (KFT)	Various products
Mt Gambier Co-op	Market milk, Cheese (Cheddar)
Suttontown (KFT)	Philadelphia Cheese, Dips

There are a further 9 factories in the Adelaide Metropolitan Area producing a wide range of products: Custard, Mozzarella, Ricotta, Butter Blending, Ice Cream, UHT Flavoured Milk, Quark, Cottage Cheese.

FIGURE 2: DISTRIBUTION OF MAJOR FACTORIES AND DAIRY FARMS IN SOUTH AUSTRALIA.



Consumers, influenced by nutritional concerns, are expected to continue to prefer low fat, high protein food over saturated animal fats (Table 5). Consequently demand for low fat dairy products such as yoghurt, quark, low fat fresh and flavoured milk and some cheeses is expected to increase.

Table 5: Australian Per capita consumption of dairy products

	Total Milk (l)	Reduced Fat Milk (l)	Other Milk* (l)	Butter/AMF (kg)	Cheese (kg)	Yoghurt (kg)	Ice Cream+ (l)	Butter Blends (kg)
1985	103.3	6.0	9.0	3.9	8.5	2.8	12.9	-
1986	101.8	7.6	9.6	3.7	8.3	2.9	12.7	-
1987	102.9	10.1	9.3	3.5	8.5	3.0	12.9	3.8
1988	101.7	12.4	9.1	3.1	8.8	3.2	12.9	3.7
1989	101.6	15.6	9.4	2.9	9.2	3.6	12.5	3.6
1990(p)	102.2	na	na	3.4	8.9	3.5	11.6	3.8

* includes UHT, Flavoured milk

+ does not include ice confections

Consumption of butter is expected to decline, due to fat content and spreadability (ABARE). Market milk consumption is expected to remain at around 104 L per person (ADC) (Table7).

Table 6: Per capita consumption - Liquid milk

Year Ended 30 June	NSW	VIC	QLD	SA	WA	TAS	TOTAL AUST
1985	98.8	108.2	111.5	103.7	93.2	100.5	103.3
1986	99.6	105.9	110.9	103.7	91.4	99.5	101.8
1987	101.5	106.3	112.5	103.4	92.8	99.4	102.9
1988	99.1	107.2	110.7	102.7	90.7	99.3	101.7
1989	97.3	107.8	111.4	104.4	92.0	101.9	101.6
1990(P)	96.1	104.6	111.6	105.4	99.5	104.5	102.2

3.3.2 Export

South Australian dairy exports were worth \$11.6 million for the 1988-89 year (ABS).

Traditionally South Australia has produced high quality cheddar cheese for export. Reliance on export markets does not ensure a stable return so the South Australian industry has continued to diversify into fresh products for the domestic market.

The volatile world dairy market will be the major influence on the Australain dairy industry for the next decade. With higher global stocks of most dairy products, prices and Australian exports are expected to decline. The value of Australian dairy exports is forecast to decline 29 percent in current dollars to \$534 million in 1990-1991. (ABARE)

3.4 Regulations

3.4.1 Dairy Industry

Four regional marketing schemes have evolved to share the returns from market milk between all dairy farmers within each region. The schemes operate with a high degree of industry self regulation and produce adequate milk for all times of the year, both for SA market milk requirements and the external markets of Alice Springs and Broken Hill.

The largest market milk equalisation scheme is industry operated by the Metropolitan Milk Equalisation Committee for dairy farmers in the Metropolitan Milk Production Area. It has legislative support under the Metropolitan Milk Supply Act. There is a regulated farmgate price for market milk based on an annual Cost of Production Survey conducted by the Metropolitan Milk Board. About 40 per cent of milk production is used for market milk.

Individual dairy companies operate similar equalisation schemes in association with the producers in the Mid North and Riverland. Some milk is purchased from the Metropolitan Milk Production Area to cover periods of shortage for market milk.

The Mid North and Riverland regions have, by self regulation, eliminated large manufacturing milk surpluses and tailored production to market milk needs. There is some surplus milk produced in spring which is sold to Dairy Vale or Farmers Union Foods in the MMB area.

In contrast, only 9 per cent of the milk produced in the South East region is used for market milk. The South East Market Milk Equalisation Committee (S.E.M.M.E.C.) equalises market milk returns for the dairy farmers supplying milk to the dairy companies in the region. This does not have legislative support.

The South East Region was the only region in South Australia not receiving a significant market milk return, due to legislation preventing the region from sending market milk to the Adelaide market. Legislation, effective from 1/1/86, transfers funds from producers in the Metropolitan Milk Supply Area to those in the South East. All legislation is currently under review.

3.4.2 Animal Health

Acts of parliament relating to the dairy industry and animal health cover stock diseases, cattle compensation, artificial breeding and brands. Relevant notifiable diseases include brucellosis, tuberculosis, Johnes disease, leptospirosis, actinomycosis and actinobacillosis.

The use of both agricultural and veterinary chemicals is controlled under regulations that provide for minimum residue levels.

Milk hygiene is monitored and regulated and potential dangers like stock grazing on sewerage irrigated pasture are being controlled.

The increasing concerns over animal welfare are covered by regulation although the current controls may change due to public pressure.

Training is conducted to ensure appropriate response to emergencies that affect livestock, such as bushfires and exotic diseases.

4. INDUSTRY POTENTIAL

4.1 Market Scenario

Overseas subsidies have led to "corrupt" world markets which influence the small SA operation. Increases in quotas of 1 per cent by the EEC represents some 990 000 tonne of product. By contrast Australian total production is 6 298 000 tonne and South Australian 370 000 tonne. Total Australian exports are 286 000 tonne and the EEC 18 000 000 tonne.

Specialising in products for the domestic market with cheddar cheese for export as a back-up gives the greatest potential for the SA industry. In recent times the South Australian processors have diversified into fresh products more than interstate processors. This has led to greater stability for both companies and farmers. Value added fresh products require a relatively constant milk intake into factories year round.

However the trend is to seasonal calving which is contrary to factory needs. The industry needs to address the issue of seasonality of production if it requires a more stable milk intake. Financial incentives being paid in the South-East are correcting the imbalance. Incentives are needed in other areas.

4.2.1 Production

The trend is for the numbers of dairy farms in the Central Adelaide Hills area to decrease due to smaller farms, rising costs, land values and environmental concerns. Larger farms could remain viable to the advantage of land management and tourism.

The Southern Hills has a reasonably reliable rainfall with larger properties however these are being increasingly affected by sub-division, environmental concerns and increasing land values. There is potential for increased production from existing dairy farms in this area.

The Lower Murray area is finite in terms of water resource but has the potential to double production. Currently 25 per cent of the SA milk is produced here.

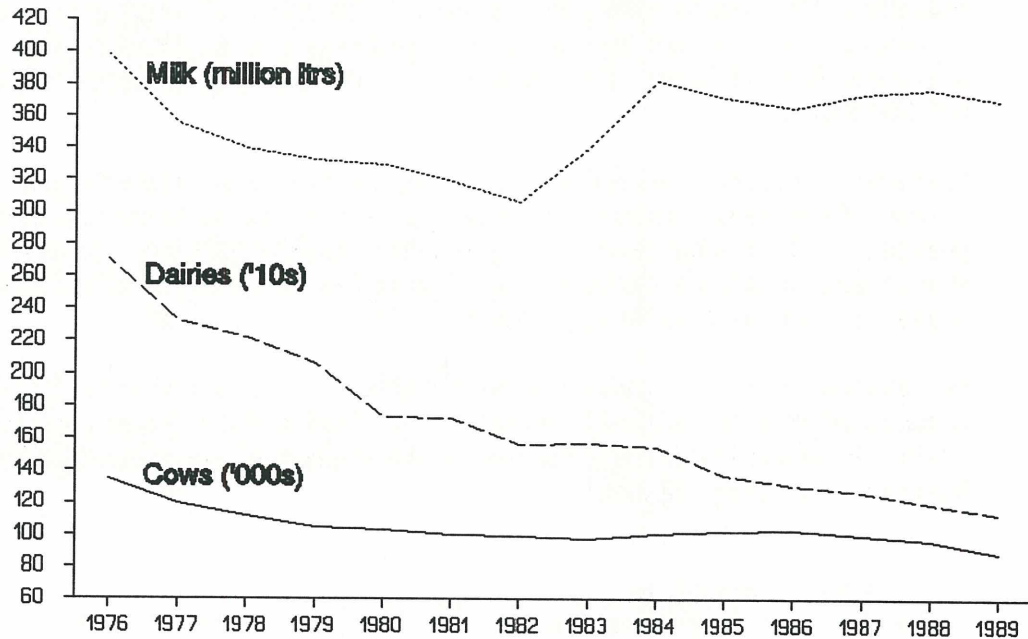
The Mid-North, whilst unlikely to expand, has potential along with the Mallee and South East for dairy feedlot style activities outside of water protection areas. The ready availability of grain and relatively cheaper land gives a potential to capitalise on lower priced feed.

The South-East has contracted over the years to the area south of Penola. There is potential for increased production and scope for expansion of dairy farms with relatively cheap land with underground water for irrigation north of Penola. Dairying however will have to compete with horticultural products and is then seen as a less efficient user of water.

The potential for increased production in South Australia will relate directly to the price received by the dairy farmer. In real terms this has reduced over the last ten years by some 36 percent and gives little incentive to increase dairy production. Surveys show the general public perceives dairy farming as an industry with a low status and long hours of work giving definite disincentives to young people wanting a career in the industry.

Farm, cow number, and production trends (Fig 2) demonstrate the general decline in dairy farm numbers with cow numbers remaining stable. Improved feeding and breeding give potential for increased milk production.

Fig 2 Production Trends in the South Australian Dairy Industry



There is potential for large scale feedlot style dairying of the type being set up interstate using multiples of up to 3,000 cows per unit outside of Water Protection Areas. The necessary capital for this type of venture will only come from large companies, and family farm syndicates. Family farms will continue to predominate as they are able to withstand the downturns better than company farms.

4.2.2 Market Opportunities

The influences of the EEC and CER will result in continued pressure on export markets. The opportunities are in value added dairy products for the domestic market that are seen as nutritious, pure and wholesome by the consumer. Markets in the ASEAN region for high quality products are increasing and there is some potential in Europe.

4.2.3 Market Returns

With Australia relying on export markets, it is expected that returns will not be maintained over the next five years. In absolute figures it is expected that the return for manufacture milk will be about 22 cents per litre by 1994 (ABARE), markedly lower than current Australian returns.

4.2.4 Long-term Industry Potential

There is considerable potential for the dairy industry to increase production and efficiency through animal and pasture breeding. The fields of genetic engineering and biotechnology have much to offer the dairy industry in the search for increased production while it is not inconceivable that in the future a proportion of a dairy farmers income will come from the pharmaceutical uses of colostrum or whey.

5. BARRIERS TO ACHIEVEMENT OF INDUSTRY POTENTIAL

Apart from the specific research items there is a need for a combined industry approach. The industry "Think Tank" started this process. However the impetus needs to continue, be industry driven, set targets for production and be seen as receiving a fair price for products.

5.1 Farm Production and Management Control

5.1.1 Competent Managers

With costs continually rising at a greater rate than milk prices, managers have to continually improve their business's productivity. This improvement covers both technical areas such as pasture yields, and financial areas such as cash flow budgetting.

In particular it is seen that all managers must recognise market opportunities and have the necessary support to produce new products that will satisfy market demand.

There is also a need for managers to have excellent communication skills so that all sections of the industry fully understand each other and are able to communicate their needs and expectations.

5.1.2 Pasture Yields

Increasing the yield of pastures has been consistently identified throughout Australia as one of the major factors influencing dairy production. The relatively short growing season in South Australia together with the diversity of climate, soil and water availability ensures that no one pasture system will suit all dairy situations.

Limitations are seen as	<ul style="list-style-type: none"> - cultivar performance - mixtures - seasonal production - efficient use of fertiliser - grazing frequency - pasture species and management - factors affecting productivity - conservation, pasture renovation and pasture utilisation.
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Each of these has an extension and research component. They cannot be developed in isolation.

5.1.3 Water utilisation

Much is known about application rates, equipment and crop needs and costs. With the changing ownership of irrigation farms there is a need for greater dissemination of the information. There are research needs for the Lower Murray district, particularly in relation to land forming, water application, surplus water disposal, salinity, plant utilisation of water and highland systems.

5.1.4 Seasonality of Production

To maximise milk production there has been a tendency to move towards seasonal calving patterns. Gains in ease of management can still be made by dairy farmers concentrating their herds calving pattern, to achieve this cows should calve every 365 days.

To maximise total returns it is necessary to identify optimum factory requirements on a yearly basis. The current pricing structures generally do not compensate for the extra costs associated with producing milk out of season.

Rather than changing milk flow the factories may be able to utilise their plant for other food production. Before any programme is implemented there must be consultation with the companies to ascertain their 'ideal' milk intake pattern. This is an extension exercise.

5.1.5 Dairy Farmer Attitudes

The dairy industry is rarely positive and tends to have a poor self image. Industry leaders in being encouraged by their constituents to focus on poor returns have re-enforced farmer uncertainty about the industry. The uncertainty and continued low returns have resulted in a continued reduction in dairy farmers. Added to this is the low social status attached to dairying, the long hours and large capital required. There is little incentive for prospective entrants to dairying.

The advent of the dairy Green Paper is likely to cause some concern amongst dairy farmers who have been used to operating in a closely regulated environment. The outcomes of changes in regulation both within South Australia and through the S.A. legislation review through the Industry Commission (I.C.) enquiry could see either a greater stability or a period of severe instability if there was total deregulation. A lot rests in the industry's ability to smooth over existing concerns about market milk sourcing and pricing.

Attitudes are not changed overnight. The industry has to believe there is a future for it and want to progress. This could be led by the companies. However there must be trust between company's and farmers and this needs to be improved.

5.1.6 Feed Costs

Pasture used efficiently is the cheapest form of feed for dairy cows. With South Australia's short pasture growing season feed costs are a major cost in producing milk.

Currently feed costs range from 53-78 percent of variable costs and continue to rise. The prices and availability of alternative feeds vary greatly from year to year. It has been estimated at least 50 percent of dairy farmers are too inflexible to utilise available feed to satisfy cow requirements. The approach tends to be "do what we did last year".

This is an extension and research problem.

5.1.7 Environment

There is increasing community concern over environmental issues (waste management, water quality). Pressure on dairy farms is increasing in all areas of the State, except the Mid North, particularly in the urban fringe and watershed areas.

Pastures grazed by stock are seen as more appropriate than cropping. However intensification of stock numbers through increased pasture production and improved management techniques gives a potential for pollution of water courses. Dairies, raceways and night paddocks if not properly managed can result in point source pollution by nitrates and phosphates. The techniques to control point source pollution are well researched overseas but may not be applicable to South Australia. Further research and extension is required.

Other areas of concern are the use of Chlorofluorocarbons (CFCs) in refrigerated bulk milk vats and chemicals used in all stages of milk production.

There is considerable monitoring of milk and dairy produce for chemical and drug residues. There appear to be few problems related to dairying but continued monitoring should be maintained.

The public concern about pollution requires attention to correct use of fertilisers, in particular nitrogen. Effective management practices that minimise pollution from effluent are required.

The development of large feedlot dairies will be restricted to areas outside water protection areas as defined by the Engineering and Water Supply (EWS).

5.1.8 High Capital Cost of Establishment and the Cost of Money

In common with other agricultural enterprises the capital required to start a dairy is large. The long hours and inadequacy of finance gives little incentive to young people to enter the industry. There is however a stability in dairying because of the monthly income and partly government controlled returns.

With an aging farmer population there is an increasing need to establish young people in agriculture. For dairying there is a need for a special financial package which should probably be linked to a training scheme. This is largely outside of the Department of Agriculture's influence.

5.2 Processed Product and Management Control

5.2.1 Competent Managers

All managers must recognise market opportunities on both the domestic and international markets and have the necessary support to produce new products that will satisfy market demand.

There is also a need for managers to have excellent communication skills so that all sections of the industry fully understand each other and are able to communicate their needs and expectations.

5.2.2 Environment

The community is increasingly concerned about the environment. Disposal of wastes from dairy factories is becoming an important issue particularly in the South East as a source of pollution to the underground aquifer.

5.3 External Markets and Public Attitudes

5.3.1 Subsidised Markets

Australia exports approximately 60,000 tonne of produce per year. The prices received are the result of subsidies and support from other exporting countries in particular the EC and U.S. The OECD MTM model indicates that international dairy prices have been decreased by between 40 and 60 percent by the intervention of governments. The returns are therefore corrupted and reflect overseas government policies not market forces.

Export returns drives some domestic markets in Australia including South Australia. This problem is currently being addressed by the Federal Government through GATT. The "Kerin Plan" support scheme is due for revision in 1992. This plan has stabilised marketing in Australia and it is likely some similar scheme will operate post-June 1992.

5.3.2 Public Perceptions of Milk and Milk Products

There is increasing public concern about "quality" issues - for example Listeria contamination of soft cheeses and antibiotic and other residues. Public health authorities periodically question the wisdom of "mass-medication" as occurs in dry cow therapy and seek the withdrawal from animal use of antibiotics such as cloxacillin.

There is a section of the public who desire to purchase raw milk. Currently in the MMB retail distribution area this is not possible. Outside this area raw milk can be purchased.

Although tuberculosis is to all intents and purposes eradicated there are still some dangers associated with consumption of raw milk, notably Listeria.

There is ongoing public discussion about the role of dairy products in the dietary fat-cholesterol debate.

5.3.3 Animal Welfare Issues

Increased community interest in animal welfare issues requires the industry to pay greater attention to such matters and reconsider practices such as tail docking of dairy cows, dehorning, management practices for bobby calves, induced calving, and management of dry cows and heifers. Design of dairy yards and sheds should also take account of welfare issues. The animal welfare lobby is opposed to feedlots for cattle and their concerns must be taken into account in any further developments in this area.

5.4 Long Term Industry Potential

There is considerable potential for the dairy industry to increase production and efficiency through animal and pasture breeding. The fields of genetic engineering and biotechnology have much to offer the dairy industry in the search for increased production.

Recent advances in technology have seen colostrum used as a pharmaceutical product for humans. Researchers are currently looking at the commercialisation of antibacterial applications of minor milk proteins that can be recovered from whey which is still largely a waste product. Additional research has recently used whey as a substrate to produce biological control agents for use on animal and plant pests.

Milk constituents are also in demand by those companies manufacturing cosmetics which target the expanding natural market.

The area of new dairy foods is expanding rapidly with the majority of this research being done overseas. The European market is constantly seeking new innovative products especially in the dairy dessert area. The recent establishment of the Dairy Industry Quality Centre in Sydney should provide a focus for product development of value added products.

6. OPPORTUNITIES

6.1 Production of a natural food

Milk and dairy products are seen as healthy, natural foods. A key to future development is to bolster and maintain the image of a high-quality, healthy, pure product. There is also potential for small scale production of 'organic' products.

6.2 Environmentally Aware Farmers

Environmentally aware dairy farmers aim to protect the environment and their industry organisations encourage responsibility of the environment. Due to the end product and current testing requirements, dairying practices tend to be less reliant on drugs and chemicals than the pig and poultry industries.

The need to protect dairy cows from inclement weather has seen less clearing of trees than other extensive industries.

These factors form a strong base to capitalise on a style of agricultural practice that is promoting a pure, clean, wholesome food from cows grazing pastures in balance with the environment.

6.3 A United Industry

Perhaps because of its relatively smaller size there is a cohesiveness about the SA Dairy Industry. The "Think Tank" identified and encouraged a united approach. Whenever major issues arise as for example the production of a Green Paper on legislation, all sectors of the industry want to be involved and usually reach consensus.

There is scope to increase the industry integration on all issues involving the whole industry in this type of climate. The process is ongoing through the dedication of some key industry leaders and the extent of integration may well be factor in the SA industry's success in the future.

6.4 Markets

Milk is a complex mixture of vitamins, minerals, proteins, fats and enzymes and new technology is discovering their potential as components of other products. Pharmaceuticals, cosmetics, knitting needles, glues, probiotics and fighting tooth decay are a few of the non-food uses of milk.

In non-dairy foods, they can be used to make alcoholic beverages and bakery goods.

These markets are not likely to be as large in volume as traditional markets but in many cases are higher value particularly in the pharmaceutical area. By diversifying into these markets there is some cushioning for the industry if commodity prices spiral downward. (Briant, 1990).

New low fat or 'organic' products provide good opportunities to increase consumption of dairy products and there is an opportunity for specialty cheeses in niche markets. In 1989-90, 20 705 tonnes of cheese was imported into Australia.

Further information on markets and export opportunities is available in Appendix 2.

7. CURRENT DEPARTMENTAL PROGRAMS RELATING TO THE BARRIERS TO ACHIEVEMENT

The following is a list of current departmental programs and projects which seek to address the barriers to achievement of the dairy industry.

7.1 Competent Managers

Many departmental programs indirectly contribute to updating both farm and factory managers technically and managerially. The three major programs and their corresponding projects follow.

7.1.1 Increased milk production through improved efficiency of feeding and management.

Research

7.1.1.1 Pasture Species for Milk Production - Flaxley

To assess the most promising species/cultivars for intake, milk production and identify toxicoses and special management requirements for growing species/cultivars under grazing conditions at Flaxley Research Centre.

Extension

7.1.1.2 Dairy discussion groups - All regions

To help farmers solve problems, gain new information and techniques to maintain and review their farm operation through groups.

7.1.1.3 Dairy Industry Monitoring program - All regions, AIB

To help farmers review the financial management of their farm operation and compare enterprises on a standard basis through the use of a financial computer program.

7.1.1.4 Focus Farms - Southern Hills and Fleurieu - Central Region

To extend management techniques, new ideas and productivity potential to young and experienced farmers through monitoring two farms and group activities.

7.1.1.5 Financial Management - All regions, AIB

To provide current and potential farmers and bankers with information on current farm enterprise profitability. To assist with applications for rural assistance.

7.1.1.6 Flaxley Demonstration Unit - Flaxley, Central Hills - Central Region

To demonstrate at Flaxley Research Centre the efficient management of dryland and irrigated pastures to maximise the return from autumn seasonal calving dairy herds.

7.1.1.7 Certificate in Farm Practice (Dairying) - Central, Murraylands, South East Regions, AIB

To assist with the management and education of young dairyfarmers within the TAFE Certificate in Farm Practice (Dairying).

7.1.1.8 Factory staff and tanker driver education - AIB, South East

To write, revise and examine TAFE certificates in Milk and Cream Grading.

7.1.1.9 Media contact - All regions, Flaxley, AIB

To inform producers of relevant technical information to improve productivity and profitability.

7.1.1.10 Dairy nutrition - All regions

Ration analysis and management options for maximum production.

7.1.1.11 Reproductive Performance of SA Dairy Herds - All regions

To evaluate and analyse the data from a survey on the reproductive performance of SA dairy herds and use the data to develop priorities for research and extension.

7.1.2 Maintain dairy farm viability

Research

7.1.2.1 Basis of Milk Payment - Flaxley

Assist the dairy industry change the basis of payment for milk by supplying information, conducting field trials and giving expert advice in relation to factors affecting the production of milk protein and fat.

Extension

7.1.2.2 Pasture Technology Transfer - All regions, Flaxley, AIB

Development of technology transfer programs to improve the efficiency and profitability of pastures.

7.1.2.3 Training in Artificial Insemination - Flaxley

The teaching of artificial insemination of cattle.

7.1.2.4 Professional Organisations

Encourage staff to be actively involved in professional organisations which promote the efficient development of the grazing and dairy industries.

7.1.3. Provide resources to maintain quality and variety of dairy produce that is consistent with community health, safety and changing tastes.

Research

7.1.3.1 Assistance to Milk Processing - Flaxley

Assist the milk processing industry in terms of specialised information and analyses.

Extension

7.1.3.2 Factory staff & tanker driver education, AIB, South East Region

To write, revise and examine TAFE certificates in Milk and Cream grading.

7.1.3.3 Media contact - All regions, AIB

To inform producers and processors of relevant technical information to improve quality, health and safety aspects.

7.1.3.4 Liaison with industry, health commission, MMB, DPIE, et al - AIB

To exchange information relevant to community health, safety and changing attitudes.

7.1.3.5 Product grading - AIB

To provide a service to industry to help maintain dairy produce that is of improved quality and variety.

7.1.3.6 Factory and farm licences and inspections - All regions, AIB

Compliance with regulations and health requirements.

7.1.3.7 Mastitis Awareness

To develop a greater awareness of the importance of mastitis control in dairy herds.

7.2 Pasture Yields

7.2.1. Evaluation of grass and legume species for production, persistence and disease resistance.

Research

7.2.1.1 Dryland Pasture Species - Flaxley

To evaluate the range of grass and legume species currently available in terms of production, persistence and disease resistance at sites of differing soil types and rainfall in the Adelaide Hills.

7.2.1.2 Irrigated Pasture Species - Flaxley, Murraylands Region

To evaluate a range of white clovers and legumes under irrigation for production, persistence and disease resistance at irrigated sites in the Adelaide Hills and the Murray Swamps.

7.2.1.3 New Perennial Grasses - Flaxley

To identify from commercial sources or collections perennial grasses which will persist and be productive under commercial conditions.

7.2.1.4 Pasture Species for Milk Production - Flaxley

To assess the most promising species/cultivars for intake, milk production and identify toxicoses and special management requirements for growing species/cultivars under grazing conditions at Flaxley Research Centre.

7.2.1.5 Flaxley Demonstration Unit - Flaxley

To demonstrate at Flaxley Research Centre the efficient management of dryland and irrigated pastures to maximise the return from autumn calving dairy herds.

7.2.1.6 Breeding persistent disease and pest-resistant lucerne for irrigate areas - Northfield Research Laboratories

To identify high yielding persistent winter-active lucernes with high forage quality and resistance to pathogens.

7.2.1.7 Overseas ryegrass cultivar assessment - AIB, South East, Murraylands

To test 120 perennial and 60 short rotation rye grass.

7.2.1.8 High Rainfall Pasture Research - Flaxley

To select and evaluate commercial or near commercial grass and legume pasture species to increase the productivity, nutritive value and persistence of cattle pastures.

7.2.1.9 Incidence and Significance of Endophyte in Perennial Grass Seed Lines - Flaxley

To determine the incidence of endophyte in perennial ryegrass and tall fescue seed commercially available and to quantify effects of endophyte on forage yield and persistence in pure swards and grass/clover mixtures under irrigation and dryland management.

7.2.1.10 National Evaluation of Sub Clover - Flaxley

To evaluate advanced breeding lines of *ssp. subterraneum* and *yanninicum* sub clovers from the National Sub Clover Improvement Program in field trials in the Mount Lofty Ranges.

7.2.1.11 New Dryland Grasses for the High Rainfall Zone - Flaxley

To identify and develop new pasture grasses for the grazing industries in the higher rainfall zone of southern Australia.

Extension

7.2.1.8 Ryegrass cultivar assessment - All regions

To assess and display through demonstration trials on farm properties the characteristics of selected ryegrass cultivars.

7.2.1.9 Clover cultivar assessment - Murraylands

To assess and display through a demonstration trial on a farm property the characteristics and usefulness of selected clover varieties.

7.2.2 Improvement of establishment, nutrition, management and conservation of pasture.

Research

7.2.2.1 Soil and Plant Nutrition - Flaxley

Research the nutrition of soils and pastures in the high rainfall zone of the Central Region in terms of phosphorus, potassium, nitrogen, sulphur and molybdenum.

7.2.2.2 Soil Data Base - Flaxley

To assess the feasibility of linking soil/plant nutrition data with the recently developed soil/landscape and climate maps for the high rainfall zone of Central Region to allow better assessment of nutritional problems.

7.2.2.3 Liming of Soils - Flaxley

To continue to monitor sites from previous experiments to establish long term effects of liming.

7.2.2.4 Pasture Establishment and Management - Flaxley

To improve the establishment of pastures by the evaluation of different weed control and sowing practices, different rhizobia strains and the control of root diseases.

7.2.2.5 Productivity of Dairy Cows grazing Perennial Ryegrass - Flaxley

To compare ryegrass cultivators under grazing for dry matter yield, persistence and their effect on milk production and composition.

- (a) Of a New Zealand and a European cultivar both of low endophyte content.
- (b) Of a commercial cultivar with high and low levels of endophyte.

Extension**7.2.2.6 Dairy pastures trial - Mid North Region - Central Region Murraylands**

Investigate new pasture species and their management.

7.2.2.7 Evaluation of grazing systems - All regions

To gather basic information on production levels in relation to rainfall, livestock grazing and management strategies.

7.3 Water Utilisation**7.3.1 Investigation of farm management practices in relation to the environment.****Extension****7.3.1.1 Irrigation Management - Murraylands**

Demonstrate the increased dry matter production due to increased and more efficient water utilisation.

7.4 Seasonality of Production**7.4.1 S.A. Reproductive Survey - Flaxley**

To investigate the reproductive performance of S.A. dairy herds by the survey of farm data, particularly in relation to the high producing cow and to use the information in the development of future dairy reproduction research and extension programs.

7.4.2 Reproductive Performance of S.A. Dairy Herds - Flaxley

To evaluate and analyses the data from a survey on the reproductive performance of S.A. dairy herds, especially in relation to the high producing cow and to use the data to develop priorities for research and extension.

7.5 Dairy Farmer Attitudes

The Dairy Farmer attitude barrier is addressed through all of the current programs. There is no specific program set up to address this barrier.

7.6 Feed Costs

- 7.6.1 Increased milk production through improved efficiency of feeding and management.**
- See 7.1.1

7.7 Environment

- 7.7.1 Investigation of farm management practices in relation to the environment.**

Research

7.7.1.1. Pastures to Minimise Erosion - Flaxley

To select pasture species and develop pasture management strategies to minimise the risk of soil erosion.

7.7.1.2. Management to Minimise Water Pollution - Flaxley

To investigate farm management practices in relation to the environment, especially in terms of minimising nitrogen and phosphorous pollution of groundwater and streams.

7.7.1.3 Irrigation Scheduling Management - Murraylands

Scheduling Irrigation for increased productivity on Lower Murray Dairy farms.

Extension

7.7.1.4 Effluent Manual and Fact Sheets - AIB

In coordination with all other Australian states produce a national effluent manual for dairy advisers and national fact sheets for farmers.

7.7.1.5 Approved effluent systems - AIB

In conjunction with E&WS and Industry attempt to document effluent systems suitable for the Mount Lofty Ranges, Murray Swamps & Lakes and South East.

7.7.1.6 Farm Planning - Central Region

Discussion groups encourage dairy farmers to produce and implement farm plans that promote sustainable agriculture.

7.8 High Capital Cost of Establishment and Cost of Money

This is largely outside the Department of Agriculture's influence.

7.9 Long Term Industry Potential

7.9.1 Evaluation of grass and legume species for production, persistence and disease resistance.

- See 7.2.1

7.9.2 Improvement of the efficiency of dairy cattle reproduction and breeding.

Research

7.9.2.1 Embryo Technology - Flaxley

To develop new reproductive/embryo technologies to improve the efficiency of the use of genetic material of high genetic merit.

- (a) Improve the success rate of embryo and oocyte collection, culture and transfer, particularly of single cell embryos.
- (b) To develop the technique of nuclear transfer to produce dairy cattle clones.
- (c) To evaluate the feasibility of supply of cattle clones for research and commercial purposes.
- (d) To evaluate the feasibility of producing constructs for injection into embryos to transgenic cattle with enhanced production or other desirable traits.

7.9.2.2 Superior Milk Protein Genotypes - Flaxley

To identify at the DNA level, artificially bred dairy bulls which have milk protein genotypes associated with superior manufacturing properties in milk.

7.9.2.3 Typing of Dairy Bulls used for Artificial Breeding - Flaxley

To identify at the DNA level dairy bulls bred by artificial insemination which have milk protein genotypes associated with superior manufacturing properties in milk.

7.9.2.4 S.A. Reproductive Survey - Flaxley

To investigate the reproductive performance of S.A. dairy herds by the survey of farm data, particularly in relation to the high producing cow and to use the information in the development of future dairy reproduction research and extension programs.

7.9.2.5 Reproductive Performance of S.A. Dairy Herds - Flaxley

To evaluate and analyses the data from a survey on the reproductive performance of S.A. dairy herds, especially in relation to the high producing cow and to use the data to develop priorities for research and extension.

8. ADDITIONAL DEPARTMENTAL PROGRAMS NOT RELATING TO THE BARRIERS TO ACHIEVEMENT

A number of services which are provided to the dairy industry underpin the present situation and are seen to be important in maintaining existing productivity (and product quality) and in providing a basis for future improvement. Many animal health and extension activities fall into this category.

8.1 Animal Health

Private veterinary practitioners provide the bulk of animal health services and receive substantial laboratory support from the Central Veterinary Laboratories (VETLAB). VETLAB provides diagnostic services including isolation and identification of the organisms causing mastitis and monitoring of the antibiotic resistance of such isolates, investigations into the causes of abortion and infertility, laboratory support to the BTEC program and diagnosis of mineral and trace element deficiencies. In addition tests for certification for freedom from disease for animals for sale and export are carried out. Speakers for industry meetings and workshops are also provided.

Approximately 5 F.T.E.s are involved in providing the above services to the dairy industry.

Research

8.1.1 Epidemiology of helminth parasites in dairy cattle.

To determine the seasonal patterns and extend of helminth parasitism in dairy herds on irrigated pastures and evaluate the laboratory and field procedures involved.

8.1.2 Survey of selenium and magnesium status of dairy cows.

To determine if trace element and magnesium deficiencies have a role in causing reduced reproductive performance in cows in Fleurieu peninsula.

8.1.3 Prevention, control and diagnosis of Johnes Disease in dairy cattle

To determine the extent of infection in S.A. dairy cattle, evaluate protocols for reducing incidence within a herd and simplify the laboratory diagnosis of Johnes Disease.

8.1.4 Survey of pestivirus in dairy cattle (an add-on to the selenium and magnesium survey)

To determine the extent of pestivirus infection in S.A. dairy cattle and investigate its association with abortion.

8.1.5 Mastitis Awareness

To develop a greater awareness of the importance of mastitis control in dairy herds and determine the level of adoption and effectiveness of mastitis control strategies in herds of high and low cell count.

Approximately 3.5 FTEs are involved in servicing the above research programs.

8.2 General Extension and Development

In addition to state and district programs that target specific areas approximately 2 FTE's are utilised in development of new extension programs and providing specific advice and problem solving to farm and product queries from industry and the general public. The advice given covers all areas from the person who wants to start a dairy, school projects, and where to get cheese starters and cultures to indepth analysis of farmers and industry problems. Speakers for industry meetings are also provided.

Support to research and industry is given by the maintenance and continued development of the Flaxley Research Centre, approximately 3.5 FTE's contribute to maintaining this resource.

8.3 Industry Liaison and Policy

To enhance the development of relevant research and extension priorities and policy advice the equivalent of 1.5 FTE's are involved in both departmental liaison between the Department of Agriculture and industry (production and manufacture).

Policy represents and increasing proportion of time allocated. Currently 0.8 FTE provides direct policy advice to the Minister.

9. RESOURCES

9.1 Staff Allocation to Current Programs

The dairy industry commodity area directly employs 33 staff representing 4.2 percent of departmental staff allocated to research, extension, diagnostic, regulation and policy. In comparison, dairy production comprised 4.1 percent of South Australia's gross value of agricultural production for 1988-89.

9.2 Allocation of Resources to Current Programs

The annual direct expenditure in servicing the dairy industry is calculated (Table 8) to be \$1 346 800 (1990/91). This figure does not include departmental administrative costs or the Rotavirus and medic breeding programs at Northfield.

9.3 Proportion of each program in Research, Extension, Regulation and Policy

Approximately 65 percent of the resources in the dairy commodity area are applied to research, 20 percent to extension, 5 percent to regulation, 9 percent to diagnostic and 1 percent to policy (Figure 3). Extension, regulation and policy are entirely State funded except for the income from licences and grading which is approximately \$8 500 per year. Nineteen percent of research funds are provided by industry and the dairy produces approximately \$147 000 a year to operating and some salary costs. The cost of running Flaxley Research Centre activities approximates to 26 percent of total resource. The cost of running the Flaxley Research Centre can be viewed as being apportioned across all major programs.

Fig 3 Funding of Research, Extension, Regulation

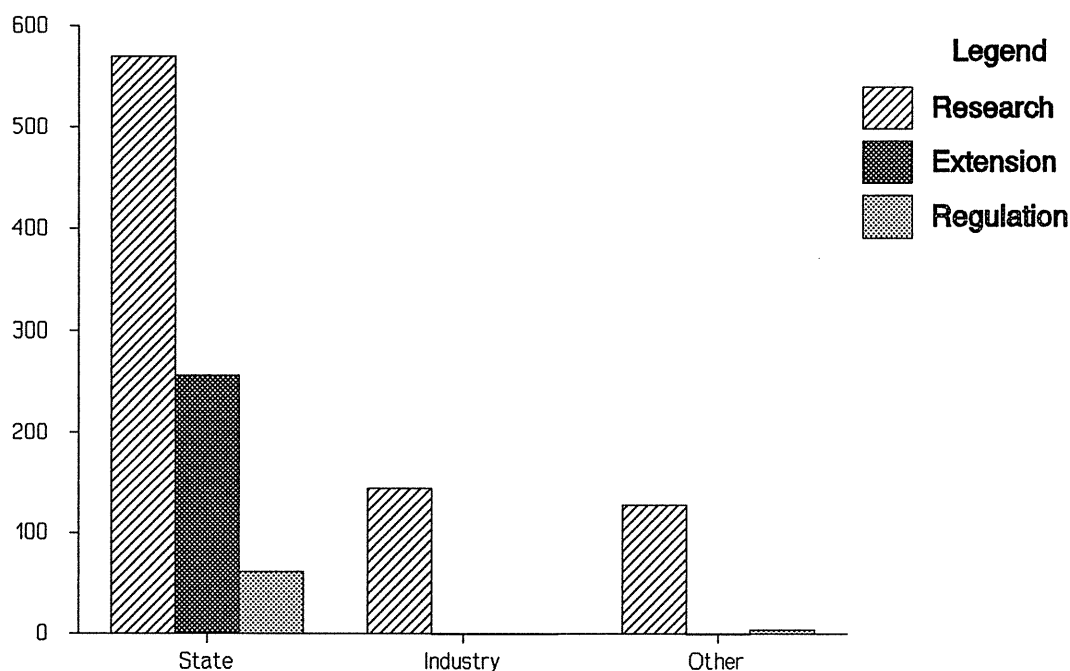


Table 8 lists, for each of the ten major Departmental programs for the dairy industry, the expenditure and sources of funds. Expenditure comprises salaries/wages and operating expenses. Expenditure and income are subdivided into state funds and non-state funds.

Table 9 shows for each of the ten programmes, the percentage of total expenditure allocated to that programme. The expenditure on that program is then split into that percentage provided from state funds and non-state sources.

Table 8: Expenditure and funds sources for major Departmental programmes for the Dairy industry

PROGRAMME	EXPENDITURE (\$'000 per annum)					SOURCE OF FUNDS (\$'000 per annum)		
	SALARY and WAGES		OPERATING		TOTAL EXPENDITURE	INCOME	STATE FUNDS	NON-STATE FUNDS
	STATE	NON-STATE	STATE	NON-STATE				
1. PASTURE EVALUATION	78.0	35.4	9.1	31.6	154.1	-	94.3	59.8
2. PASTURE ESTABLISHMENT	62.0	14.0	7.5	1.1	84.6	-	69.5	15.1
3. REPRODUCTION	113.3	-	16.1	37.3	166.7	-	129.4	37.3
4. HEALTH*	67.7	23.6	8.6	7.6	227.5	-	76.3	31.2
5. MANAGEMENT	79.1	-	5.6	-	84.7	-	84.7	-
6. VIABILITY	66.0	-	12.3	-	78.3	-	78.3	-
7. ENVIRONMENT	38.4	-	9.5	-	47.9	-	47.9	-
8. QUALITY	72.7	-	9.9	0.3	82.9	8.5	82.6	0.3
9. POLICY/LIAISON	59.6	-	8.9	-	68.5	-	68.5	-
10. FLAXLEY	71.8	-	132.8	-	351.6	147.0	204.6	-
TOTALS	708.6	73.0	220.3	77.9	1346.8	155.5	936.1	143.7

* Vetlab, only included in total expenditure

The cost of running the Flaxley Research Centre can be viewed as being apportioned across all major programs.

Table 9: Analysis, by programme, of expenditure on major Departmental programmes for the Dairy Industry

PROGRAMME	ANNUAL EXPENDITURE (\$'000)	PERCENT OF TOTAL EXPENDITURE	PERCENT OF STATE EXPENDITURE ON PROGRAMME	PERCENT OF NON- STATE EXPENDITURE ON PROGRAMME
1. PASTURE EVALUATION	154.1	11.4	61.2	38.8
2. PASTURE ESTABLISHMENT	84.6	6.3	82.2	17.8
3. REPRODUCTION	166.7	12.4	77.6	22.4
4. HEALTH	227.5	16.9	33.5	13.7
5. MANAGEMENT	84.7	6.3	100.0	-
6. VIABILITY	78.3	5.8	100.0	-
7. ENVIRONMENT	47.9	3.6	100.0	-
8. QUALITY	82.9	6.2	99.6	0.4
9. POLICY/LIAISON	68.5	5.1	100.0	-
10. FLAXLEY	351.6	26.0	58.2	41.8

Table 3: Financial Information Dairy Farm

Survey 1987/88

	MID NORTH	CENTRAL HILLS	SOUTHERN HILLS	MURRAY SWAMPS	SOUTH EAST
NO. OF DAIRY FARMS	75	239	251	204	192
AVERAGE DAIRY AREA (ha)	191	96	141	167	132
FARM SIZE (ha)	418	148	179	195	176
IRRIGATION (ha)	1	10	4	38	13
AV. HERD SIZE (cows)	67	70	106	91	96
AV. DAIRY INCOME	65469	70784	105966	96268	79073
AV. OTHER FARM (income)	26505	21612	4389	9006	13581
AV. TOTAL COSTS	55547	69898	78732	74214	55848
AV. DAIRY GROSS MARGIN	46396	46435	69618	64747	55149
1987-88 DAIRY FARM SURVEY RESULTS					

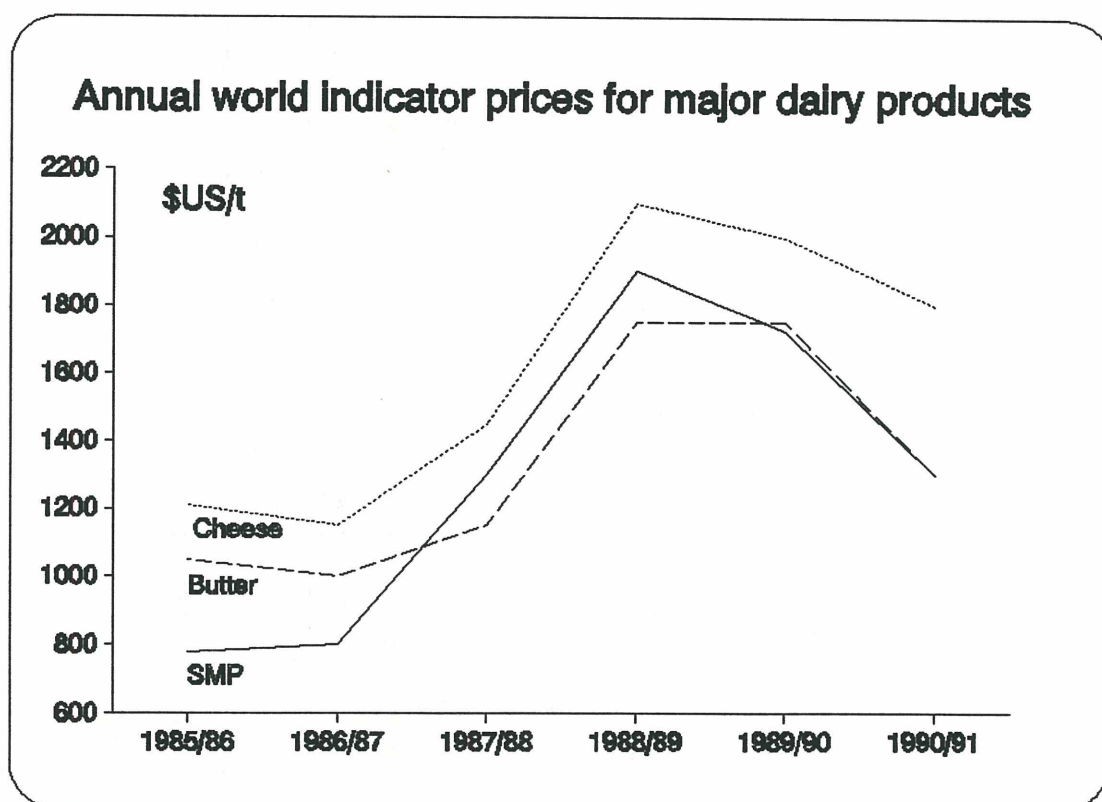
MARKETS

APPENDIX 2

Market Prospects

The volatile world dairy market will be the major influence on the Australian dairy industry for the next decade. The increase in EC subsidies and growing production in Europe indicate prices are likely to be depressed in the short term. (FIG.1)

FIG 1 ANNUAL WORLD INDICATOR PRICES FOR MAJOR DAIRY PRODUCTS



Australia exports a significant part of its production each year. (Tables 1 & 2)

Table 1: AUSTRALIAN EXPORTS '000 Tonne

	1987	1988	1989	Total Production 1000 t
Cheese	59.6	62.9	61.5	175
Butter/AMF	37.7	52.3	53.9	106
Condensed/Evaporated Milk	2.6	2.8	2.0	44
Casein	8.0	7.2	5.3	5.3
SMP	76.3	63.3	76.4	140
WMP	50.3	48.0	49.1	56

Table 2: MAJOR MARKETS AND AMOUNT IMPORTED 1990

	ASIA			MIDDLE EAST			AMERICAS			EUROPE			AFRICA			PACIFIC ISLANDS	
	Imports	Aust. Export	% Share	Imports	Aust. Export	% Share	Imports	Aust. Export	% Share	Imports	Aust. Export	% Share	Imports	Aust. Export	% Share	Imports	Aust. Export
Butter/ Butter- oil/AMF	69 992	24370	39.9	84 779	6468	7.9	36138	72	1.1	440466	11989	0.9	125 851	372	0.6	-	1878
Cheese	133 928	26020	19.4	166 223	13 892	8.4	138 426	5730	4.1	1918	4362	-	70773	780	1.1	-	706
SMP/BMD/ MIXES	462 748	75368	16.3	221 189	2688	1.2	247 684	16 964	6.8	0	120	-	233 474	639	0.3	-	1098
WMP	308 970	38519	12.5	54 383	39	0.7	187 633	501	0.3	58 744	-	-	123 834	385	0.3	-	2207
Whey Powder	60 565	14018	23.1	19	-	-	12 252	-	-	7200	-	-	5000	-	-	-	-
Casein	25 458	1284	5.0	454	-	-	85 397	2664	3.1	0	-	-	878	-	-	-	-

Less than six per cent of total world milk output is traded. Australia exports 7% of the world trade. The dairy policies of many countries are largely geared to domestic self sufficiency and farm income support by maintaining artificially high domestic prices by subsidies.

Australia's main exports are to Asia and the Middle East with some significant markets for cheese in Europe and skim milk powder and cheeses to the Americas (Table 2).

RETURNS

Australian and New Zealander dairyfarmers receive the lowest prices for milk when compared with countries in the OECD (Table 3).

Table 3 **FARMGATE MILK PRICES - SELECTED COUNTRIES**

	\$A/100 Kg of Milk 1989	Wholesale Price of Butter \$A/100 Kg
Belgium	40.62	4.88
Denmark	45.66	4.86
West Germany	45.69	4.91
Spain	47.69	-
France	36.83	4.94
Ireland	39.60	-
Italy	53.31	4.81
Netherlands	43.81	4.90
United Kingdom	35.64	5.33
Economic Community Average	43.20	-
Sweden	63.08	4.28
Finland	76.54	11.06
Switzerland	79.09	-
Austria	49.99	-
U.S.A.	50.25	3.73
Japan	83.19	11.08
New Zealand	22.21	-
Australia	27.77	2.40

Subsidies and support by overseas countries are substantial (Tables 4 and 5).

As a country Australia is a net exporter of dairy produce however we also import 20,000 tonne of cheese, mainly fancy types each year (Table 6). The home market constitutes some 152 000 tonnes of cheese so imports account for about 15 percent (Table 7).

**Table 4: INTERVENTION PRICES AND PERCENTAGE OF INDICATIVE WORLD PRICES
(Local Currency/Tonne)**

		1985	1986	1987	1988	1989	1990
EC							
Butter	ECU	3197.0 261%	3132.0 406%	3132.0 389%	3132.0 326%	3008.0 217%	2931.6 300%
SMP	ECU	1658.8 194%	1740.4 289%	1740.4 223%	1740.4 143%	1740.4 120%	1727.3 175%
USA							
Butter	\$US	3140.0 314%	3081.0 308%	3037.0 283%	2910.0 224%	2657.0 154%	2166.0 154%
SMP	\$US	1814.0 259%	1780.0 228%	1736.0 165%	1604.0 97%	1742.0 97%	1874.0 132%
Cheddar	\$US	2800.0 243%	2756.0 250%	2701.0 225%	2541.0 154%	2546.0 134%	2447.0 148%
JAPAN							
Butter	Y'000	1276.0 535%	1225.0 727%	1100.0 704%	1080.0 648%	1092.0 458%	1065.0 508%
SMP	Y'000	541.0 324%	541.0 411%	527.0 347%	521.0 246%	526.0 212%	513.0 243%
CANADA							
Butter	\$Can	4855.0 354%	5040.0 363%	5040.0 350%	5100.0 318%	5170.0 252%	5170.0 309%
SMP	\$Can	2890.0 301%	2920.0 270%	2980.0 213%	3010.0 148%	3030.0 141%	3050.0 181%
Indicative World Prices \$US*							
Butter		1000.0	1000.0	1080.0	1300.0	1725.0	1420.0
SMP		700.0	780.0	1050.0	1650.0	1800.0	1430.0
Cheddar		1150.0	1100.0	1200.0	1650.0	1800.0	1650.0

NOTE: Domestic support prices are those set at the start of the production season in each country.
* World prices are an average of monthly quotations in international markets.

Table 5: EC EXPORT REFUNDS (ECU/tonne)

	BUTTER	OIL	SMP	WMP	CHEDDAR
02/04/84	1252.3	1810.0	786.0	1011.6	1095.6
19/06/85	1733.3	2337.7	786.0	1081.3	1095.6
28/09/85	1814.5	2408.0	858.6	1161.0	1238.9
17/05/86	1814.4	2408.0	1020.0	1336.0	1487.6
17/10/86	2000.0	2586.8	1020.0	1423.5	1487.6
16/02/87	2115.0	2677.5	1070.0	1537.0	1487.6
15/01/88	2115.0	2627.5	1000.0	1400.0	1772.5
25/03/88	2080.0	2528.0	930.0	1400.0	1772.5
13/06/88	2080.0	2680.0	800.0	1300.0	1772.5
21/09/88	1850.0	2320.0	700.0	1200.0	1772.5
14/10/88	1850.0	3230.0	620.0	1120.6	1646.8
20/03/89	1700.0	2140.0	550.0	1000.0	1566.8
30/05/89	1550.0	1960.0	500.0	950.0	1566.8
22/02/90	1700.0	2140.0	500.0	1000.0	1516.8
20/07/90	1750.0	2200.0	700.0	1150.0	1516.8

Table 6: IMPORTS OF DAIRY PRODUCE AUSTRALIAN 1990

Year ended 30 June 1990	CASEIN	CHEESE	SMP+WMP	WHEY POWDER	BUTTER /OIL	LACTOSE	MILK
Belgium/Luxembourg	-	41	-	-	-	-	-
Denmark	-	1663	-	-	-	-	-
France	-	1115	-	-	-	-	-
Germany	-	1309	-	-	-	-	-
Greece	-	1315	-	-	-	-	-
Italy	-	931	-	-	-	-	-
Netherlands	-	1971	-	-	-	-	-
United kingdom	-	356	-	-	-	-	-
Other	-	14	-	-	-	-	-
Total EEC	-	8715	-	-	-	-	-
New Zealand	1014	8950	1477	296	1042	3702	343
Austria	-	51	-	-	-	-	-
Belgaria	-	582	-	-	-	-	-
Finland	-	-	-	-	-	-	-
Norway	-	1370	-	-	-	-	-
Romania	-	268	-	-	-	-	-
Sweden	-	414	-	-	-	-	-
Switzerland	-	219	-	-	-	-	-
Other	-	120	-	-	-	-	-
TOTAL IMPORTS	1196	20705	1477	1094	1045	3773	346

Table 7: DOMESTIC CHEESE MARKET (Product Weight)

	AUSTRALIAN	IMPORTS	1988/89 TOTAL	AUSTRALIAN	IMPORTS	1989/90 TOTAL
CHEDDAR & CHEDDAR TYPES						
Cheddar	40780	3284	44064	37876	4087	41963
Colby	330	1488	1818	637	1723	2360
Processed	37514	1658	38172	38510	1424	39934
Other (1)	3399	73	3472	4290	50	4340
TOTAL	82023	6503	88526	81313	7284	88597
ROUND EYE TYPES						
Edam	2359	1654	4013	2159	1833	3992
Gouda	2032	550	2582	2743	567	3310
Other (2)	1936	1634	3570	1478	1677	3155
TOTAL	6327	3838	10165	6380	4077	10457
SHREDDING TYPES						
Mozzarella/Pizza	17074	310	18041	17097	180	17277
Shred	92	-	92	76	-	76
TOTAL	17796	310	18106	17173	180	17353
HARD GRATING TYPES						
Parmesan	1188	305	1493	1274	325	1599
Pecorino	557	-	557	594	-	594
Repatto	47	-	47	75	-	75
Romano	1535	-	1535	1463	-	1463
Other (3)	492	350	842	760	195	955
TOTAL	3819	655	4474	4166	520	4686
FRESH TYPES						
Cottage	6175	-	6175	5884	-	5844
Ricotta	1280	-	1280	1053	-	1053
Cream (4)	5440	-	5440	5796	-	5796
Other (5)	285	-	285	226	-	226
TOTAL	13180	-	13180	12919	-	12919
MOULD RIPENED TYPES (6)	948	1932	2880	1101	1984	3085
OTHER TYPES						
Fetta	841	1123	1964	728	11247	1975
Skim/Curd	8047	-	8047	6750	313	7063
Other (7)	424	5356	5780	512	5100	5612
TOTAL	9312	6479	15791	7990	6660	14650
ALL CHEESE	133405	19717	153122	131042	20705	151747

Table 4: Domestic Cheese Market (Product Weight)

- (1) Includes: Gloucester, Egmont, Leicester, Dunlop, Nimbin, Cheshire, Cheedam, Monterey, Stirred Curd.
- (2) Includes: Swiss, Emmenthal, Fontina, Samsoe.
- (3) Includes: Fresh Pecorino, Sardo, other hard grating types.
- (4) Includes: Neufchatel.
- (5) Includes: Bakers, Quark.
- (6) Includes: Blue Vein, Camembert, Brie, other surface ripened types.
- (7) Includes: Casalinga, Havarti, Provolone, Kasseri, Fetta, Grated cheese, and other Processed pastes and spreads.

Only a small proportion of world milk production is traded in international markets each year. The major traded items are bulk butter, cheese, skim and whole milk powder, casein and condensed milk. The annual trade in these products (excluding intra-EC trade) typically accounts for around 25-27 million tonnes of product on a milk equivalent basis, less than six per cent of total world milk output. The proportion of total production of individual products entering world trade is generally much higher than for milk overall. For example, international trade in butter and butteroil has accounted for between 15 and 18 per cent of total production in recent years.

The limited extent of international trade reflects the trade and industry policies pursued by major countries. The dairy policies of many countries are largely geared to the promotion of domestic self sufficiency and the support of farm incomes through the maintenance of artificially high domestic prices. As these aims can only be achieved in conjunction with restrictions on competitive imports of cheaper dairy products, international market access has been increasingly restricted over the past twenty years.

A significant proportion of current trade is transacted under direct bilateral quota arrangements or other quantitative import controls. Much of the trade in cheese is subject to bilateral access agreements. At present Australia has bilateral quota arrangements with the EC for the supply of cheddar cheese (3,000 tonnes) and with the USA for the supply of cheese (4,000 tonnes), skim milk powder (600 tonnes), and small quantities of other minor products. These arrangements cover around 10 per cent of Australia's traditional export volumes of cheese but less than one per cent of exports of the other products involved.

In addition to direct access restrictions, international trade patterns are also affected by the increase in milk supply in individual countries resulting from domestic price support schemes. However, while many countries operate protective arrangements which boost domestic supply, only a few are significant exporters.

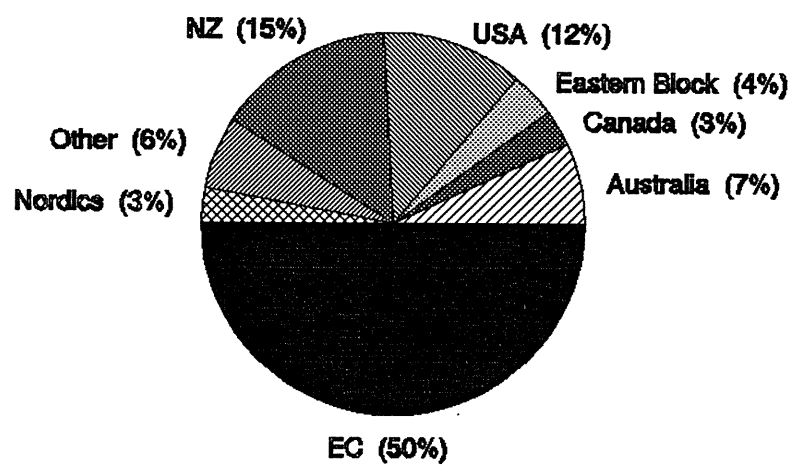
The EC is the major exporter accounting for slightly more than half of all export sales. The world's largest producer, the USSR, has remained a net importer of dairy products to date. Its import purchases have helped balance world supply and demand in recent years, particularly in the case of butter. The other major producer, the USA, has been more concerned to restrict import access to its domestic market. However, The USA has regularly disposed of its government stocks of SMP and butter in international dairy markets through subsidised sales and food aid programs.

Although it accounts for only two per cent of world milk output, New Zealand is the second largest supplier of manufactured products to the world market with about 18 percent of total sales on a milk equivalent basis. The large majority of New Zealand production is dedicated to export sales. Australia, which accounts for just over one per cent of world milk output, accounts for between six and eight per cent of export sales.

The remainder of the international market has traditionally been supplied by subsidised exports from developed economies such as Canada and the non-EC countries of Western Europe. However, over the past year, significant export surpluses have emerged from Eastern European countries such as Poland, Czechoslovakia and East Germany following their removal of historical consumer subsidies for dairy products. Poland and Czechoslovakia are expected to remain active in international dairy markets in the 1990s.

Outside of bilateral trade arrangements, the major end user markets for dairy products are the Middle East, Central and South America, North Africa and South East Asia. However, there are considerable variations between the trade flows observed for individual products.

EXPORTERS SHARE OF INTERNATIONAL MARKET
Average 1986-1988, in milk equivalents



The major exporters of butter are the EC and New Zealand. The EC is itself a major destination for New Zealand exports under a bilateral quota arrangement between New Zealand and the UK. In recent years the USSR has been a major purchaser of butter, accounting for 35 to 45 per cent of traded volumes. North African countries such as Algeria and Morocco, and the Gulf states of the Middle East, are more traditional end users of butter/butteroil.

The EC, New Zealand and Australia are major exporters of cheese. The USA is a major market taking up to 110,874 tonnes annually under current quota arrangements. A significant element of this access is restricted to subsidised exports from the EC (48,000 tonnes) and other Western European countries (25,000 tonnes). Other key markets include Japan, the Middle East and North Africa.

Much of the international trade in skim milk powder is sales of stock feed to countries such as Japan. The EC is the major supplier to world markets followed by New Zealand. The USA has traditionally supplied significant quantities of SMP to Central and South America under food aid programs. Commercial exports from the US vary greatly between years as they are dependent on the relationship between its internal support price and export prices at particular points in time. In the 1980s Eastern European suppliers also began trading in significant volumes. Central and South America and North African countries such as Egypt and Algeria have traditionally been major end-user markets of powder for human consumption.

Wholemilk powder is used in a wide variety of end user markets but is often sold in instantised forms in consumer packs for retail sales in countries which lack widespread refrigeration. The Middle East, Africa, Central and South America are the major markets for this product in world terms.

Casein exports are dominated by New Zealand and the EC with Ireland being the major exporter within the EC. Japan and the United States remain key end user markets for this product.

Australia currently exports around 27 per cent of its annual milk production (slightly more than 35 per cent of its output of manufactured products). Its principal export products in both value and volume terms are skim milk powder and cheese, with butter and wholemilk powder also major contributors to export sales. In recent years increasing volumes of long life milk have been exported to the growing retail markets of Asia.

Australian exports are concentrated in South East Asia, Japan and the Middle East with only limited industry involvement in the North African and American markets. This pattern reflects our natural geographic advantage in our current markets. It is also influenced by the extent to which Australia is excluded from other major markets by direct restrictions (as in the case of the EC and USA) or by the impacts of export subsidy programs of major competitors.

Japan remains the largest single market for exports followed by ASEAN nations such as the Philippines, Singapore, Thailand and Malaysia. Saudi Arabia is the largest single market in the Middle East.

The pattern of product sales also varies between regions. Japan remains a major market for Australian cheese. Traditionally this trade has been dominated by sales of cheddar cheese for processing but in recent years there has been strong growth in the sales of natural cheeses for direct consumption including cream cheeses, mozzarella and shredding type cheeses. Japan is also a significant purchaser of SMP for industrial uses.

The Middle East has traditionally been a strong market for processed varieties of cheddar cheese and butter/butteroil. The nations of South East Asia predominantly purchase skim milk powder and butteroil with much of this product being recombined to produce fluid milk for resale in local markets.

Taiwan and North Asia remain the principal destinations for export sales of wholemilk powder.

Prices received in the international market vary considerably between bilateral quota markets and markets subject to global competition. Returns from quota markets are influenced by the domestic price structure in the importing country. Domestic prices for milk and dairy products vary markedly between countries in line with differences in the costs associated with production and domestic price support arrangements. (For a comparison of internal support prices in selected countries and international prices, see Table 6). In general, domestic returns in quota markets are well above international prices.

International prices in non-quota markets are more uniform and largely determined by the policy initiatives of major Western producers. Owing to its dominant position in terms of supply volumes for most major products, the EC tends to set traded prices in those international markets which are not subject to quota restrictions. Typically export prices in non-quota markets tend to equate to the internal supported price for products in the EC less the available EC export refund (see Table 7).

Other factors which can influence international market price movements include, the level of government held stockpiles of surplus product in the USA and EC, changes in regulations relating to internal disposals of surplus product in these countries and the seasonality of product availability from Southern Hemisphere producers.

While New Zealand supplies a significant share of world exports, it is dependant on export markets for a large proportion of its sales owing to the absence of a significant domestic market. Consequently, it tends to be a price taker in world markets for most products other than casein.

The periodic disposal of US product surpluses in world markets also has a destabilising influence on trade and prices. To a large extent, however, US support arrangements act more to limit the extent of increases in international price for products such as SMP rather than affect day to day market pricing.

An indication of the strong link between international market prices and EC export subsidies is shown by the following comparison of movements in internal EC prices, export refunds and international prices for butter since 1981.

Internal pressures within the EC brought about a reduction in the level of subsidies provided to exports in 1988 and 1989. These changes, in conjunction with the decline in intervention stocks of butter and SMP during these years allowed international dairy prices to rise substantially. However, an easing of internal budgetary pressures, coupled with increased production and static consumption in the EC, has seen a renewed emphasis placed on subsidised export sales.

Export refunds for all major products except cheese have been increased by around \$US 300 per tonne, in 1990, and international prices have fallen accordingly. EC export refund payments in September 1990 amounted to 80 percent of the prevailing international price for exports of SMP, and around 190 percent of the traded price of butter. The distorting impacts of export subsidies on international prices is such that producer returns for exports are now well below those prevailing in the early 1980s in both nominal and real terms.

Australia with only 30% support which is not Government funded is therefore operating in a corrupt market.

Removal of EC protection policies have been estimated to lead to an increase in world prices of dairy produce of between 40 and 60 per cent. Australia with its low cost production would be well positioned to capitalise on these markets.

However the EC currently exports above 50% of world trade.

Other countries such as the USA, Japan, Canada, Eastern Europe and the USSR all have some support mechanism for local production.

The South Australian industry with something like 82% of its manufactured product exported either overseas or interstate relies heavily on the prices received. The 36 per cent of milk that is consumed as market milk returns nearly twice the price per litre than milk for manufacture.

South Australia has traditionally produced high quality cheddar cheese for both export and the local market. The reliance on volatile export markets does not ensure a stable return. There are greater returns to be made from diversification into products other than cheddar cheese. There is however a cost to this in capital equipment, production skills and more volatile markets.

The South Australian industry has continued to diversify into fresh products which give an earlier return than cheddar cheese. These products require high technical input in product development. The South Australian companies tend to be small in size and so may not be able to justify the research and development needed.

The fresh products produced in South Australia are of a very high quality but again because of company size, it is harder to promote on a national scale.