Agriculture
Canada

ORIENTATION OF CANADIAN AGRICULTURE

A TASK FORCE REPORT

A Review of the Canadian Agriculture and Food Complex —the Commodities

Volume I
Part B

1977

CANADA DEPARTMENT
OF AGRICULTURE

ORIENTATION OF CANADIAN AGRICULTURE

A TASK FORCE REPORT

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FOREWORD

The Task Force on the Orientation of Canadian Agriculture was set up by the Senior Management Committee of Agriculture Canada with the following terms of reference: to describe Canadian agriculture and its evolution since 1950; to examine federal agricultural policies and programs; and to propose alternative planning options for agriculture consistent with national objectives.

Members of the Steering Committee were: B.B. Migicovsky, Chairman; D.G. Hamilton; M.J. Heney; A.E. Hannah; J.E. McGowan; and G.I. Trant.

Members of the Task Force were: W.S. Ferguson and W.J. Anderson, Co-Chairmen; C.J. Bishop; C.D. Caldwell; A.S. Johnson; and W.H. Leggett.

We wish to pay special tribute to the contribution of Dr. W.S. Ferguson whose untimely death occured part way through the process of preparation of these reports. Dr. Ferguson served as Co-Chairman of the Task Force and made a major contribution both to the background philosophy and organization of the study. In particular, the review of the agricultural resources of the country and the production potential from their efficient use attracted his attention. The sections on these topics reflect many of his ideas. As they were still unfinished at the time of his death, others have had to carry them forward, but his competent leadership in these areas remains evident. Dr. Ferguson was keenly interested in the whole project and its implications for future planning of the industry, and his sincere dedication to the development and preparation of the reports is gratefully acknowledged.

Volume I of the report contains 21 chapters which describe Canadian agriculture and changes that have taken place since 1950. Chapters 1 to 9 cover production and market structure, resources, input supply system, institutional services and domestic food utilization. The material in chapters 10 to 21 is concerned with commodity groups; these chapters, therefore, contain a more detailed description of the situation with respect to livestock and crops.

Volume II contains an analysis of the goals, programs, instruments and performance indicators of Canadian agricultural policy.

Volume III includes five sections which examine:

(1) broad scenarios of the future demand for and supply of Canadian agricultural products;

(2) the case for maximizing agricultural production;

(3) instability in Canadian agriculture;

(4) a family-farm oriented agriculture; and

(5) various economic instruments which have been used or proposed to manage agricultural supply and demand.

Volume IV has been written for Senior Management. It contains summaries of Volumes I, II and III and the conclusions of the Task Force.

The authors of the papers in Volumes I, II and III are listed in each Volume. With the exception of (5) Volume III, the papers were prepared by officials of Agriculture Canada. Ms. Lucie Larose edited all the manuscripts, supervised the final typing and preparation of the charts and made the arrangements for printing. These tasks involved many hours of painstaking work, which the Steering Committee and Task Force gratefully acknowledge. Special thanks are also due to Dr. W. Pigden for his help and advice in preparing the papers on animal products and the supply scenarios.

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TABLE OF CONTENTS

(Chapters 10 to 21)

Page

Foreword i

List of Tables viii

List of Figures xiv

10. The Canadian Dairy System - Highlights 271

10.1 Introduction 273

10.2 The Primary Sector 274
10.2.1 Industry Structure 274
10.2.2 Breeds of Dairy Cattle 278
10.2.3 Technology 278
10.2.4 Resource Utilization 280
10.2.5 Comparison with Other Countries 282
10.2.6 Beef from the Dairy Herd 285
10.2.7 Marketing and Pricing of Milk 285
10.2.8 Regional Variations 293
10.2.9 Farm Income 296

10.3 The Secondary Sector 296
10.3.1 Industry Structure 299
10.3.2 Technology 299
10.3.3 Production and Consumption 301
10.3.4 Substitute Products 307
10.3.5 Utilization of Fat and Non-fat Solids 309
10.3.6 Distribution and Marketing 314
10.3.7 International Marketing and Trade 316

11. The Canadian Beef System - Highlights 321

11.1 Introduction 323

11.2 The Primary Sector 324
11.2.1 Resource Utilization 324
11.2.2 Cattle Inventory and Breeds 325
11.2.3 The Cow-Calf Enterprise 327
11.2.4 The Finishing Enterprise 331

11.3 The Secondary Sector 336
11.3.1 Slaughter and Processing 336
11.3.2 Marketing and Merchandising 340
11.3.3 Consumption 341
11.3.4 International Trade 343

12. The Canadian Pork System - Highlights 349

12.1 Introduction 351

Page

12.2 The Primary Sector 352
12.2.1 Resource Utilization 352
12.2.2 Hog Inventory and Breeds 352
12.2.3 Hog Enterprises and Production Costs 353
12.2.4 Farm Structure 354
12.2.5 Technology 354
12.2.6 Marketing and Pricing Systems 356
12.2.7 Aggregate Production 357
12.2.8 Prices 360
12.2.9 Income 360

12.3 The Secondary Sector 363
12.3.1 Industry Structure 363
12.3.2 Resource Use and Value Added 365
12.3.3 Technological Factors 365
12.3.4 Secondary Marketing and Merchandising 367
12.3.5 Pork Consumption 367
12.3.6 International Trade 369

13. The Canadian Poultry System - Highlights 371

13.1 Introduction 373

13.2 The Primary Sector 373
13.2.1 Resource Utilization 373
13.2.2 Industry Structure 375
13.2.3 Size of the Industry 376
13.2.4 Production Costs 377
13.2.5 Technology 381
13.2.6 Primary Marketing 383

13.3 The Secondary Sector 384
13.3.1 Industry Structure 384
13.3.2 Secondary Marketing 386
13.3.3 Consumption 387
13.3.4 International Trade 390

14. The Canadian Sheep and Lamb System - Highlights 393

14.1 Introduction 395

14.2 The Primary Sector 399
14.2.1 Resource Utilization 399
14.2.2 Industry Structure 399
14.2.3 Regional Variations 399
14.2.4 Technology 401
14.2.5 Primary Marketing and Pricing 402

14.3 The Secondary Sector 404
14.3.1 Industry Structure 404
14.3.2 Secondary Marketing 408
14.3.3 International Trade 413

Page

15. Other Livestock Production - Highlights 417

15.1 Fur Bearers 421
15.1.1 Introduction 421
15.1.2 The Primary Sector - Mink Ranching 421
15.1.3 The Secondary Sector 427

15.2 Goats 431
15.2.1 The Primary Sector 431
15.2.2 The Secondary Sector 432

15.3 Horses 433
15.3.1 Introduction 433
15.3.2 The Primary Sector 433
15.3.3 The Secondary Sector 439

15.4 Rabbits 441
15.4.1 The Primary Sector 442
15.4.2 The Secondary Sector 442

16. The Canadian Wheat System - Highlights 445

16.1 The Primary Sector 447
16.1.1 Regional Assessment 447
16.1.2 Research and Technology 451
16.1.3 Farm Level Pricing 455
16.1.4 Comparison with Other Countries 456

16.2 The Secondary Sector 457

16.3 International Marketing and Trade 459
16.3.1 International Wheat Agreement 465
16.3.2 GATT 466

17. The Canadian Non-Wheat Cereal System - Highlights 467

17.1 The Primary Sector 469
17.1.1 Regional Variations 469
17.1.2 Research and Technology 474
17.1.3 Farm Level Pricing 474

17.2 The Secondary Sector 474
17.2.1 Local Farm Utilization 474
17.2.2 Domestic Utilization - Industrial and Human 476
17.2.3 Structure of the Secondary Industry 477
17.2.4 Interregional Movement of Grain 477

17.3 International Trade 479
17.3.1 Exports 479
17.3.2 Canada's Competitive Position 481

Page

18. The Canadian Oilseed System - Highlights 483

18.1 Introduction 485

18.2 The Primary Sector 485
18.2.1 Production Variations 485
18.2.2 Research and Technology 488
18.2.3 Public and Private Services 490
18.2.4 Farm Level Pricing 491
18.2.5 Farm Income 491
18.2.6 Comparison with Other Countries 491

18.3 The Secondary Sector 493
18.3.1 The Industry's Products 493
18.3.2 Domestic Consumption 494
18.3.3 International Trade 494
18.3.4 Oilseed Meal and Cake 497
18.3.5 Inedible Oils 500

19. The Canadian Forage System - Highlights 503

19.1 Introduction 505

19.2 The Primary Sector 505
19.2.1 Regional Variations 505
19.2.2 Research and Technology 507

19.3 The Secondary Sector 511
19.3.1 Hay Trade 511
19.3.2 Forage Seed Production 511
19.3.3 Processed Forage Products 513

20. The Canadian Horticulture System - Highlights 517

20.1 Introduction 519

20.2 The Primary Sector 520
20.2.1 Resource Utilization 521
20.2.2 Industry Structure 523
20.2.3 Technology 523
20.2.4 Marketing Channels 523
20.2.5 Government Programs 524
20.2.6 Competitiveness 525

20.3 The Secondary Sector 526
20.3.1 Regional Distribution 534
20.3.2 Technology 534
20.3.3 Industry Structure 535
20.3.4 Marketing Processed Fruits and Vegetables 535
20.3.5 Government Programs 535
20.3.6 Industry Trends and Problems 536

Page

21. Other Crop Production - Highlights 541

21.1 Introduction 543

21.2 Buckwheat 547

21.3 Honey 547

21.4 Maple Products 547

21.5 Mustard Seed 551

21.6 New Crops 551

21.7 Pulses 553
21.7.1 Dry Peas 553
21.7.2 Dry Beans 554

21.8 Sugar Beets 555

21.9 Tobacco 556

LIST OF TABLES
(Chapters 10 to 21)

Page

10.1 The Canadian Dairy Herd by Region, Selected Years, 1950 to 1975 275

10.2 Percent of Census Farms Reporting Milk Cows Classified by Herd Size, by Province, Canada, Selected Years, 1951 to 1971 276

10.3 Income and Expenses for Representative Ontario Industrial Milk Farms, 1970 to 1975 281

10.4 Number of Milk Cows and Yield in Economic Regions and Selected Countries, Average 1961-1965 to 1974 283

10.5 Structure of Dairy Herd in Selected Countries, Selected Years, 1969 to 1974 284

10.6 Dairy Cattle Output in Exports of Breeding Stock and Cattle and Calves Slaughtered, Canada, Selected Years, 1950 to 1975 . 286

10.7 Milk Production and Utilization by Region, Canada, Selected Years, 1950 to 1975 289

10.8 Total Farm Sales in Milk Equivalent by Region, Canada, Selected Years, 1950 to 1975 290

10.9 Industrial Milk Returns Adjustment Formula, Canada, 1975 292

10.10 Industrial Milk Prices, Canada, 1972/73 to 1976/77 294

10.11 Prices of Milk for Fluid Uses by Province, Canada, 1975/76 and 1976/77 295

10.12 Estimates of Dairy Production by Several Measures of Regional Production, Canada, 1974 and 1975 297

10.13 Dairy Receipts by Region, Canada, 1974 and 1975 298

10.14 Registered Dairy Plants by Region and by Products Manufactured, Canada, 1974 and 1975 300

10.15 Total Output of Dairy Products by Region, Canada, Selected Years, 1950 to 1975 302

10.16 Domestic Disappearance of Dairy Products and Margarine, Canada, Selected Years, 1950 to 1975 304

10.17 Direct Price and Income Elasticities, Canadian Demand for Dairy Products, Selected Years, 1957 to 1976 308

10.18 Usage of Nonfat Milk Constituents as Food, Canada, Selected Years, 1950 to 1975 313

10.19 Support and Average Wholesale Prices for Butter, Skim Milk Powder and Cheese, Canada, 1950 to 1976 315

10.20 Measures to Balance Milk Markets in Developed Countries, 1974 and 1975 317

10.21 Feed Use of Milk and Milk Powder in Developed and Centrally Planned Countries (in Milk Powder Equivalent), 1976 319

10.22 Total Exports and Imports of Dairy Products, Canada, Selected Years, 1950 to 1975 319

11.1 Beef Cattle on Canadian Farms, Canada, Selected years, 1951 to 1976 325

11.2 Structure of the Primary Beef Industry, Canada, 1975 327

11.3 Regional Distribution of Beef Cow Population, Canada, 1975 ... 328

11.4 Number of Calves Born to All Cows by Region, Canada, Selected Years, 1951 to 1976 329

11.5 Calf Marketings at Public Stockyards and Shipped Direct to Packing Plants, Canada, Selected Years, 1951 to 1975 330

11.6 Inward Movement of Cattle and Calves Marketed Through Public Stockyards and Some Country Auctions and Returned to Country Points, by Region, Canada, Selected Years, 1951 to 1975 331

11.7 Fed Cattle Slaughter as a Percent of Total Slaughter, Canada, Selected Years, 1962 to 1965 332

11.8 Annual Average Costs of Feedlot Enterprise, Canada, 1970/71 to 1975/76 332

11.9 Regional Distribution of Farms Reporting Cattle on Feed, Canada, 1971 333

11.10 Cattle Marketings at Public Stockyards and Shipped Directly to Packing Plants, and Inventory of Cattle and Calves at June 1, Canada, Selected Years, 1951 to 1975 333

11.11 Value Added in the Secondary Sector, Canada, Selected Years, 1951 to 1973 336

11.12 Structure of the Secondary Beef Industry, Canada, 1975 337

11.13 Total Inspected Slaughter by Province, Canada, Selected Years, 1951 to 1975 338

11.14 Beef Carcass Grade Distribution Percentage, Canada, 1972 to 1976 338

11.15 Production of Hides from Cattle and Calves, Canada, Selected Years, 1951 to 1973 340

11.16 Average Warm Carcass Weight of Cattle Slaughtered, Canada, Selected Years, 1951 to 1975 340

11.17 Elasticity Estimates for Beef and Veal, Canada, 1975 342

11.18 Exports and Imports of Beef and Veal, Canada, Selected Years, 1951 to 1975 344

11.19 Exports and Imports of Live Cattle and Calves, Canada, Selected Years, 1951 to 1975 344

11.20 Trade in Cured Beef and Imports of Canned Beef and Veal, Canada, Selected Years, 1950 to 1975 345

11.21 Exports and Imports of Tallow, Canada, Selected Years, 1950 to 1975 345

11.22 Exports and Imports of Raw Cattle Hides, Canada, Selected Years, 1950 to 1975 347

11.23 Purebred Beef Cattle and Semen Trade, Canada, Selected Years, 1961 to 1975 347

12.1 Hog Output and Farm Cash Receipts, Canada, 1950 to 1975 359

12.2 Hog Carcass Prices at Toronto, Current and Constant Dollars, Selected Four-Year Averages, 1950 to 1975 362

13.1 Poultry Stock Placed on Farms, Canada, 1965 to 1975 377

13.2 Production of Eggs by Region, Canada, Selected Years, 1950 to 1975 378

13.3 Fowl and Chicken Meat Production by Region, Canada, Selected Years, 1950 to 1975 379

13.4 Turkey Meat Production by Region, Canada, Selected Years, 1950 to 1975 380

13.5 Dealer's Average Selling Price for Poultry Feeds, Canada, 1960 to 1975 382

13.6 Average Farm Prices of Eggs and Egg-Feed Ratio, Canada, 1965 to 1975 383

13.7 Numbers of Processing Plants, Canada, Selected Years, 1952 to 1975 385

13.8 Variability of Consumer Prices and Poultry Consumption, Canada, 1961 to 1975 388

13.9 Canadian Trade in Poultry Products, Selected Years, 1950 to 1975 392

14.1 Farm Cash Receipts from Sheep, Canada, 1950 to 1975 396

14.2 Mutton and Lamb Industry Statistics, Canada, 1950 to 1975 397

14.3 Wool Industry Statistics, Canada, 1950 to 1975 398

14.4 Sheep Industry Structure, Canada, 1971 400

14.5 Total Production of Sheep and Lamb by Province, Canada, 1975 . 400

14.6 Number of Processing Plants by Province and Volume, and Number of Plants Inspected, Canada, 1975/76 406

14.7 Mutton and Lamb Production, Trade and Domestic Disappearance, Canada, 1975 407

14.8 Wool Production, Trade and Domestic Disappearance, Canada, 1975 407

14.9 Elasticities of Demand for Lamb, Beef and Pork, Canada, 1976 . 412

14.10 Live Sheep Imports and Exports, Canada, 1975 412

15.1 Mink Industry Structure by Province, Canada, 1975 423

15.2 Mink Ranching Industry Statistics, Canada, 1951 to 1975 423

15.3 Resource Utilization per Mink Pelt Produced, Canada, Selected Years, 1951 to 1975 425

15.4 Mink Secondary Industry Structure, Canada, Selected Years, 1951 to 1975 429

15.5 Manufactured Mink Fur Exports, Canada, 1970 to 1975 430

15.6 Goat Population and Industry Structure, Canada, 1951, 1961 and 1971 431

Page

15.7 Federally Inspected Slaughter of Goats, Canada, Selected Years, 1951/52 to 1975/76 432

15.8 Horses on Farms by Province, Canada, Selected Years, 1951 to 1971 434

15.9 Census Farms Reporting Horses, Selected Years, 1961, 1966 and 1971 435

15.10 Total Horse Registrations by Province, Selected Years, 1951 to 1975 436

15.11 Light Horse Registrations, Canada, Selected Years, 1951 to 1975 436

15.12 Draft Horse Registrations, Canada, Selected Years, 1951 to 1975 436

15.13 Racetrack Betting, Canada, Selected Years, 1951 to 1976 437

15.14 Employment in the Standardbred Racing Industry, Canada, Selected Years, 1961 to 1975 438

15.15 Production of Pregnant Mare Urine, Ontario, 1970/71 to 1974/75 439

15.16 Horse Slaughter by Dressed Weight by Province, Canada, 1968/69 to 1975/76 440

15.17 Inspected Horse Slaughter by Province, Canada, 1968/69 to 1975/76 440

15.18 Horse Product Exports by Commodities, Canada, Selected Years, 1951 to 1975 441

15.19 Horse Product Imports by Commodities, Canada, Selected Years, 1951 to 1975 441

15.20 Value of Exports and Imports of Horses and Horse Products, Canada, 1975 441

15.21 Rabbit Population and Industry Structure, Canada, 1971 442

15.22 Federally Inspected Slaughter of Rabbits, Canada, Selected Years, 1965/66 to 1975/76 443

15.23 Rabbit Skin Imports, Canada, Selected Years, 1951 to 1975 444

16.1 Wheat Production and Area by Region, Canada, 1975/76 Crop Year 447

Page

16.2 Wheat Production and Disposition, Canada, 1974/75 Crop Year .. 458

16.3 Flour and Millfeeds Production and Exports, and Domestic Consumption of Flour, Canada, 1974/75 Crop Year 460

17.1 Land Use, Production and Farm Value of Production of Barley, Oats, Corn, Mixed Grain and Rye by Region, Canada, 1970-1974 Average (Crop Years) 473

17.2 Supply and Disposition of Barley, Oats, Corn and Rye, Canada, 1970-1974 Average 475

17.3 Utilization of Cereal Grain and Products by Domestic Industry, Canada, 1970-1974 Average 478

17.4 Secondary Industry Structure, Non-Wheat Cereals, Canada, 1974 478

18.1 Oilseed Production, Canada, 1971-1975 Average 489

18.2 Canadian Imports of Edible Fats and Oils, Selected Five-Year Averages, 1951 to 1975 496

18.3 Canadian Exports of Edible Fats and Oils, Selected Five-Year Averages, 1951 to 1975 498

18.4 Canadian Oilcake and Meal Production, Imports and Exports, 1971-1975 Average 499

19.1 Estimated Forage Area by Province, Canada, 1971 507

19.2 Forage Seed Production and Marketing, Canada 1970-1974 Average 513

20.1 Area in Horticultural Crops, Canada, 1975 519

20.2 Number of Producers in Horticulture, Canada, 1971 520

20.3 Production and Trade of Fresh Fruits, Vegetables and Ornamentals, Canada, 1975 521

20.4 Farm Cash Receipts from Horticulture by Region, Canada, 1975 . 521

20.5 Processed Fruit and Vegetable Industry, Canada, 1974 534

21.1 Area and Value of Other Crops, Canada, 1970-1974 Average 545

21.2 Distribution of Other Crops by Quantity Imported and Exported, Canada, 1950-1974 Average 546

21.3 Distribution of Other Crops by Value Imported and Exported, Canada, 1950-1974 Average 546

LIST OF FIGURES
(Chapters 10 to 21)

Page

10.1 Milk Utilization, Canada, 1950 to 1975 288

10.2 Utilization of Fat and Nonfat Components in Visible Milk Products, as Milk Equivalents, Canada, 1975 310

10.3 Utilization of Fat and Nonfat Components in Visible Milk Products, as Milk Equivalents, 1950 to 1975 312

11.1 Growth in the ROP Program, Canada, 1967 to 1975 326

11.2 Number of Cattle and Calves on Farms, Canada, 1950 to 1975 ... 335

11.3 Approximate Disposition of a Fed Beef Steer, Canada, 1975 339

12.1 Composition of the Hog Herd, Canada, 1976 355

12.2 Census Farms Reporting Pigs by Size of Operation, Canada, 1971 355

12.3 Proportion of Hogs Graded by Index, Canada, 1975 355

12.4 Hog Marketings, Canada and Regions, 1950 to 1975 358

12.5 Hog Prices in Toronto, Calgary and United States Markets, 1950 to 1975 361

12.6 Approximate Disposition of a Market Hog, Canada, 1976 364

12.7 Estimated Value-Added Components in Swine Production, Processing and Marketing Cycles, Canada, 1975 366

12.8 Per-Capita Domestic Disappearance of Pork, Canada, 1950 to 1976 368

13.1 Values and Value Added, Canadian Poultry System, 1975 374

13.2 Per-Capita Consumption of Poultry and Eggs, Canada, 1951 to 1975 389

14.1 Weekly Price for Good Lambs at Ontario Stockyards, 1975 403

14.2 Domestic Slaughter Including Live Imports for Slaughter vs. Imports of Mutton, Canada, 1950 to 1975 405

14.3 Federally Inspected Slaughter as a Percentage of Total Sheep and Lamb Slaughter, Canada, 1950 to 1975 409

14.4 Lamb Utilization Chart, Canada, 1976 410

Page

14.5 Mutton and Lamb Production and Domestic Disappearance, Canada, 1950 to 1975 411

14.6 Wool Production and Domestic Disappearance, Canada, 1950 to 1975 414

14.7 Wool Exports and Imports, Canada, 1950 to 1975 415

15.1 Mink Industry Structure and Production, Canada, 1951 to 1975 . 424

15.2 Mink Pelt Prices, Canada, 1951 to 1975 426

15.3 Raw and Dressed Mink Pelt Trade, Canada, 1951 to 1975 428

16.1 Wheat Production and Area, Canada, 1950 to 1976 448

16.2 Exports of Canadian Wheat Flour, Crop Years 1949/50 to 1974/75 461

16.3 Exports of Canadian Wheat, Crop Years 1949/50 to 1974/75 463

16.4 Exports of Canadian Durum Wheat, Crop Years 1949/50 to 1974/75 464

17.1 Seeded Area of Barley, Oats, Corn, Mixed Grain and Rye, Five-Year Period Annual Averages, Canada, 1950 to 1974 470

17.2 Yield of Barley, Oats, Corn, Mixed Grain and Rye, Five-Year Period Annual Averages, Canada, 1950 to 1974 471

17.3 Exports, Animal Feed, Waste and Dockage for Barley and Corn, Five-Year Period Annual Averages, Canada, 1950 to 1974 . 472

17.4 Percent of Farms with Oats, Barley, Mixed Grain and Rye in Manitoba, Saskatchewan and Alberta, Census Years, 1951 to 1971 480

18.1 Soybean Production and Domestic Disappearance, Canada, 1950 to 1975 486

18.2 Flaxseed Production and Domestic Disappearance, Canada, 1950 to 1975 486

18.3 Sunflowerseed Production, Canada, 1950 to 1975 487

18.4 Rapeseed Production and Domestic Disappearance, Canada, 1950 to 1975 487

18.5 Relative Increase of Oilseed Crops in Agriculture, Canada, 1951 to 1975 492

18.6 Oilseed Crushing, Canada, 1961 to 1975 495

Page

19.1 Forage Area, Canada, 1951 to 1976 506

19.2 Tame Hay Area, Eastern and Western Canada, 1951 to 1976 506

19.3 Forage Seed Production, Imports and Exports, Canada, 1950 to 1974 514

19.4 Dehydrated Alfalfa Production by Province, Canada, 1975 514

20.1 Production and Disappearance of Apples, Canada, 1950 to 1976 . 527

20.2 Production and Disappearance of Strawberries, Canada, 1950 to 1976 528

20.3 Production and Disappearance of Cabbage, Canada, 1950 to 1976 529

20.4 Production and Disappearance of Carrots, Canada, 1950 to 1976 530

20.5 Production and Disappearance of Onions, Canada, 1950 to 1976 . 531

20.6 Production and Disappearance of Peas, Canada, 1950 to 1976 ... 532

20.7 Production and Disappearance of Potatoes, Canada, 1950 to 1976 533

20.8 Plants and Value of Shipments, Fruits and Vegetable Processors, Canada, 1950 to 1975 537

20.9 Canned Fruit and Vegetable Imports, Canada, 1955 to 1975 539

21.1 Distribution of Other Crops by Area and by Farm Income, Canada, 1950-1974 Average 544

21.2 Production and Exports of Buckwheat, Canada, 1950 to 1976 548

21.3 Number of Beekeepers and Total Production of Honey, Canada, 1950 to 1976 549

21.4 Maple Products Production, Canada, 1950 to 1976 550

21.5 Production and Exports of Mustard Seed, Canada, 1951 to 1976 . 552

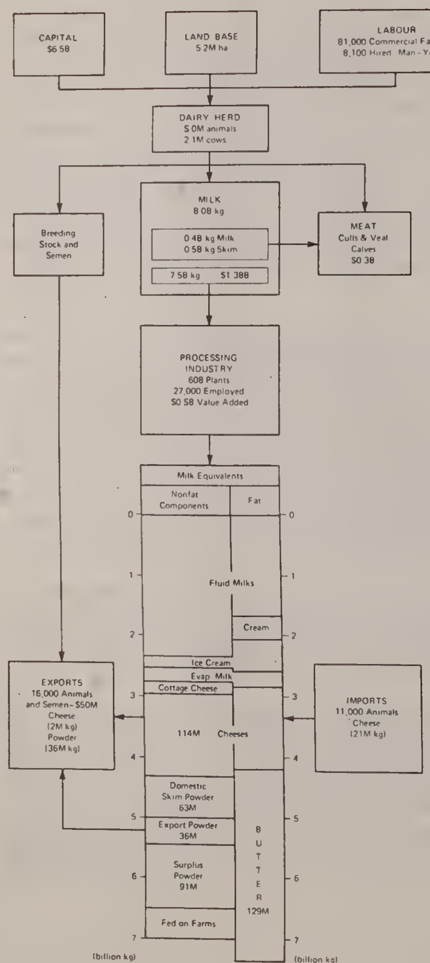
21.6 Disappearance, Production and Imports of Sugar, Canada, 1950 to 1976 557

21.7 Total Canadian Tobacco Sales, Domestic and Exports Shares, 1950 to 1976 559

21.8 Domestic Sales Trends of Cigarettes, Cigars and Cut Tobacco, Canada, 1950 to 1976 560

THE CANADIAN DAIRY SYSTEM

1975



B Billion
M Million

1. Dairy products rank as some of the most valuable and nutritious foods in Canadian diets. Milk protein contributes about 23 percent of the average Canadian daily protein intake. The high quality protein complements the nutritional value of plant proteins thereby reducing total protein requirements in the diet. Additionally, milk is one of the most important dietary sources of minerals and vitamins.

2. Dairying is one of the most important of the Canadian agriculture and food industries. In 1975, it provided over 80,000 producers with $1.9 billion in farm cash receipts or 19 percent of total farm income in Canada.

3. Dairy production is divided into two major sectors, fluid milk and manufacturing milk. The former is characterized by high production in larger, efficient herds plus some manufacturing milk, the latter by generally smaller herds and more seasonal production, primarily on grass and a lower level of efficiency.

4. Dairy production is based primarily on forages, which are well adapted to production on class 3 and 4 land. While considerable grain and protein supplements are utilized for relatively high producing cows such concentrates represent a small part of the total feed requirements.

5. Regional orientation of dairy production is very pronounced; about 75 percent of milk is produced in Ontario and Quebec with the largest proportion of the manufacturing milk from Quebec.

6. Total output of milk has been about the same since 1955. This means, in effect, that some decreases in overall consumption have been offset by population increases. Changes in consumption patterns are reflected in decreased use of butter and fluid milk and increased consumption of cheese, yogurt, desserts, etc.

7. The dairy herd is a major source of meat. Most of the Canadian veal and a large proportion of the manufacturing grade beef comes from dairy herds. Large numbers of male dairy calves are available for beef production but are currently incompletely utilized.

8. Capital investment per cow has increased dramatically since 1970. In Ontario, it was $1720 in 1970 and $4358 in 1975, a 69 percent increase in constant dollars.

9. Marketing of fluid and industrial milk in Canada is controlled by quotas. Prices for manufacturing milk are maintained by the federal government through support prices on butter, cheese and skimmilk powder.

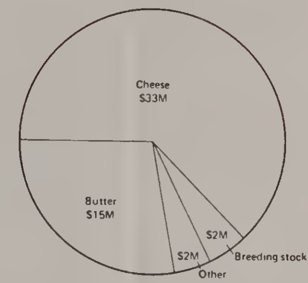
10. Milk processing ranks second only to meat in importance in the food industry. There are currently about 600 processing plants employing about 27,000 persons. Shipment of dairy products from processing plants is valued at $2.2 billion in 1974.

11. There has been a major shift in emplasis on the value of the two major milk components; the relative value of fat has decreased and that of the nonfat components has increased.

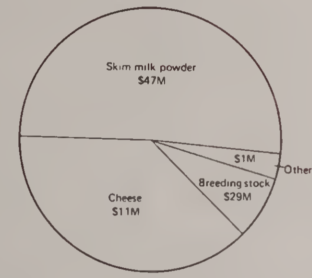
12. Substitutes for dairy products have replaced about one–half the butter requirements and much of the creams'. Substitutes have not made major inroads on other dairy products.

13. On–farm utilization of skimmilk has decreased drastically since 1950 and has been the major factor contributing to Canada's surplus skimmilk powder problem. It has been replaced in animal feeds essentially with other protein sources, some of it imported soybean protein. A secondary aid in the skimmilk powder surplus is the reduction in butterfat consumption and the increased consumption of low fat milk foods such as 2 percent milk and cottage cheese.

ANNUAL IMPORTS
AVERAGE 1971–75
$52 MILLION

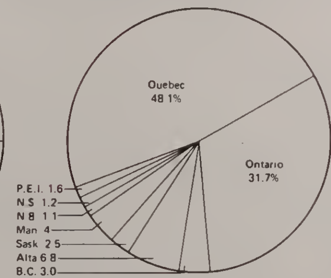


ANNUAL EXPORTS
AVERAGE 1971–75
$88 MILLION

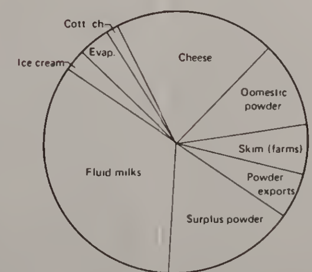


FARM REVENUE

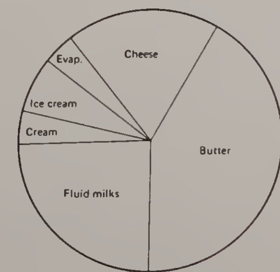
REGIONAL DISTRIBUTION OF MANUFACTURING MILK



UTILIZATION OF NONFAT COMPONENTS



FAT UTILIZATION



10. THE CANADIAN DAIRY SYSTEM

10.1 INTRODUCTION

The dairy industry in Canada comprises the production of milk, processing it into a wide range of products, and their distribution and sale. About 7.7 million tonnes of milk are produced each year. This is processed into fluid milk, butter, skim milk powder, cheeses, ice cream, creams, evaporated milk and other products. These products are sold in essentially all food stores in Canada; skim milk powder and some cheese are exported. Additionally, the dairy herd provides 25 percent of the beef consumed in Canada.

Milk products are a very important source of protein, vitamins, minerals and energy in the nutrition of Canadians. In 1975, the very high quality protein of milk contributed about 23 percent of the average daily intake of 90 grams of protein by Canadians. Milk protein contains essential amino acids that complement the nutritional value of plant proteins, thereby reducing the total protein required in our diet. Consumers spent 14 percent of their food dollar on domestically produced milk products in 1974; expenditures for home use totalled $13.3 billion in 1974 excluding the hotel, restaurant and institutional (HR&I) trade. Including dairy beef, the dairy industry provided the agricultural base for 18 percent of food purchases in Canada.

Sales of milk, veal and dairy-cow beef off dairy farms in 1975 were $1.9 billion. This represented 19 percent of total farm income in Canada; milk alone represented 17 percent. Income from the sale of milk was the most important single source of farm cash receipts in Quebec, Ontario, British Columbia and Nova Scotia; Quebec received 48 percent of total farm income from dairying. This milk was produced by 2.1 million cows in a total dairy herd of 5 million animals on an estimated 81,000 commercial dairy farms. About 50 percent of milk is produced for the fluid market, part of which goes to industrial markets.

Milk processing ranks second in the food industry to slaughter and meat processing with shipments valued at $2.2 billion (1974). There are currently about 600 milk processing plants employing 27,000 persons in processing and distribution.

The Canadian milk producer is among the most efficient in the world but the economic pressures are many and the balancing of improved efficiency, cost of production, product prices and product consumption is the major challenge facing the dairy industry. In spite of these obvious problems the demand for milk products continues to be strong, and milk production continues to be a very significant part of the agriculture scene in Canada.

10.2 THE PRIMARY SECTOR

Three biological features of the dairy cow influence its place in the agricultural scene. Firstly, the cow is a ruminant, converting forages and plant components that the human cannot use into a highly nutritious human food. Secondly, almost three years elapse between birth of a heifer and milk production, thereby making it difficult to make marked short-term changes in milk production, either on an individual basis or an industry-wide basis; it is not economically feasible to switch to and from other agricultural enterprises. Thridly, the cow produces milk every day over a 300-day lactation period and it is extremely difficult to make short-term changes in the volume of milk produced.

A significant feature of the primary sector has been the differences between fluid-milk, manufacturing-milk and cream producers. The first have received the highest milk prices and have been technologically the most advanced and with the largest herds. The last have had the smallest herds, usually with other sources of income. These differences have been decreasing with the markedly reduced number of cream producers, with the trend to market pools and giving fluid-milk quotas to more manufacturing-milk producers, and with technological advances by the latter such as installing bulk-milk tanks.

Milk in Canada is produced on farms that differ widely in size, in the state of technological development and in the markets for their milk or cream. Many evolutionary changes have occurred and are occurring. The following describes these changes.

10.2.1 Industry Structure

Cow Numbers and Milk Yield.

Dairy cow numbers have been declining in the past 25 years but yield per cow has been trending upward. Dairy cow numbers have declined from 3,119,200 in 1950 to 2,135,500 in 1975, a drop of 983,700, or 32 percent (Table 10.1). Cow numbers declined in all regions except in Quebec, where there was a slight increase. Yield per cow in Canada rose 73 percent between 1950 and 1975 from 2,172 kilograms to 3,762 kilograms. British Columbia has the highest yield per cow at about 5,500 kilograms or 46 percent above the national average. Quebec has the lowest average milk yield per cow, about 13 percent below the national average. Yield per cow is not an accurate assessment of improvement in milk yield because of the higher percentage of non-commercial cows (i.e., cows producing for home consumption) in the national dairy herd in 1950. However, the increases in yield are largely due to increases in efficiency resulting from higher-yielding cows, better nutrition and better management on more highly specialized farms.

Table 10.1 THE CANADIAN DAIRY HERD BY REGION, 1950 to 1975[a]

	Maritimes[b]	Quebec	Ontario	Prairies	B.C.	CANADA
			- 000 head -			
1950	211.4	936.2	1008.0	870.7	92.9	3119.2
1955	212.5	1035.0	1025.0	788.0	90.0	3150.5
1960	175.5	1009.0	975.0	714.3	91.0	2964.8
1965	151.0	1020.0	936.0	604.0	84.0	2795.0
1970	113.0	950.0	820.0	426.0	80.0	2389.0
1971	105.9	906.3	755.3	407.1	80.5	2255.1
1972	101.0	910.0	736.0	384.0	79.8	2210.8
1973	96.0	915.0	700.0	361.0	80.0	2152.0
1974	93.0	930.0	620.0	354.0	83.0	2080.0
1975[c]	98.5	950.0	640.0	357.0	90.0	2135.5

[a]As at June 1.
[b]Includes Newfoundland.
[c]As at July 1.

Source: Statistics Canada, Cat. 21-513.

Table 10.2 PERCENT OF CENSUS FARMS REPORTING MILK COWS CLASSIFIED BY HERD SIZ
BY PROVINCE, CANADA, SELECTED YEARS, 1951 to 1971

	Maritimes						
	1-7 Cows	8-17 Cows	18-32 Cows	33-47 Cows	48-62 Cows	63 cows and over	Total Farms
	percent						
1951	86	12	2	*	*	*	49505
1956	79	18	3	*	*	*	41796
1961	69	24	6	1	*	*	25615
1966	61	27	9	2	1	*	16973
1971	50	29	13	5	2	2	8893
	Quebec						
	1-7 Cows	8-17 Cows	18-32 Cows	33-47 Cows	48-62 Cows	63 cows and over	Total Farms
	percent						
1951	53	39	7	1	*	*	109443
1956	39	47	13	1	*	*	101105
1961	30	49	19	2	*	*	80509
1966	21	42	29	6	1	*	62020
1971	14	28	40	14	3	1	41874
	Ontario						
	1-7 Cows	8-17 Cows	18-32 Cows	33-47 Cows	48-62 Cows	63 cows and over	Total Farms
	percent						
1951	51	39	9	1	*	*	106687
1956	41	41	15	2	*	*	94948
1961	33	39	22	4	1	1	72849
1966	27	33	27	9	3	1	51865
1971	25	24	28	14	5	3	35083

Table 10.2 (Concl'd) PERCENT OF CENSUS FARMS REPORTING MILK COWS CLASSIFIED BY HERD SIZE, BY PROVINCE, CANADA, SELECTED YEARS, 1951 to 1971

	Prairies						
	1-7 Cows	8-17 Cows	18-32 Cows	33-47 Cows	48-62 Cows	63 cows and over	Total Farms
	percent						
1951	85	14	1	*	*	*	174576
1956	79	18	2	*	*	*	148492
1961	75	22	3	1	*	*	121283
1966	73	21	4	1	*	*	84536
1971	71	19	6	2	1	1	54210
	B.C.						
	1-7 Cows	8-17 Cows	18-32 Cows	33-47 Cows	48-62 Cows	63 cows and over	Total Farms
	percent						
1951	79	14	5	1	*	*	14856
1956	71	16	9	2	1	1	12259
1961	63	15	14	5	2	1	8720
1966	63	9	15	8	3	2	6452
1971	67	4	10	10	5	5	5285
	Canada						
	1-7 Cows	8-17 Cows	18-32 Cows	33-47 Cows	48-62 Cows	63 cows and over	Total Farms
	percent						
1951	69	26	5	*	*	*	455067
1956	59	31	8	1	*	*	398600
1961	57	33	12	2	*	*	308976
1966	47	30	17	5	1	1	221846
1971	42	23	21	9	3	2	145315

[a]Indludes Yukon and Northwest Territories.
*Less than 1 percent.

Source: Statistics Canada, Census of Agriculture, 1951 to 1971.

Herd Size

There has been a gradual trend towards fewer dairy farms with larger herds (Table 10.2). The 1951 census showed 455,067 farms in Canada reporting dairy cows. However, 69 percent of those reporting kept fewer than eight cows. By 1971, the number of dairy farms dropped to 145,315 with 61,568 farms, or 42 percent in the 1 to 7 cow category. At the other end of the scale, 228 farms kept herds of 63 milk cows and over in 1951. By 1971, the number of farmers in this category had increased more than ten-fold to 2,340 farms. The largest herds as a percentage of total herds in 1971 were in British Columbia with 5 percent of farms keeping 63 dairy cows or more, followed by Ontario with 2.9 percent, the Maritimes with 1.5 percent, Quebec with 1.1 percent, and the Prairie Provinces with 0.8 percent. The 1976 census is expected to show a further reduction in the number of dairy farms and a continuing trend towards larger herds. More dairy farms will specialize only in milk production; other current dairy farms will cease to exist through retirement of the owner or through specialization in another field of agriculture.

10.2.2 Breeds of Dairy Cattle

The major dairy breed is the Holstein, comprising 80 percent of the dairy herd. It is a high-volume producer of milk, generally of a lower fat content; total fat production tends to be the same as for other breeds, with higher production of protein and much higher production of lactose and therefore of nonfat components.

Of the total herd of 5 million animals, 595,000 are registered purebreds, as follows: Holstein-Friesian, 500,000; Ayshire, 50,000; Jersey, 30,000; and Guernsey 15,000. These numbers have steadily increased over the years from an estimated total of 250,000 in 1950. Canadian purebred stock form an important genetic pool for the improvement of the dairy herd. Its excellence is recognized around the world.

Not all farms that keep milk cows sell milk or cream and therefore would not be considered commercial dairy farms. At the time of the 1971 census, there were 102,774 producers (50,080 industrial milk, 54,233 cream shippers) registered with the Canadian Dairy Commission (CDC), plus an estimated 18,000 fluid milk shippers. This was from a total of 120,000 dairy farms compared to the total of 145,000 farms reporting dairy cows. In 1975, nearly all milk and cream shippers were registered with the CDC, a total of 81,034 (33,539 industrial milk, 28,272 cream shippers, 19,221 fluid milk). They were estimated to have a mean of 27 cows per farm.

10.2.3 Technology

The best of Canadian dairy technology compares favourably with that of most developed countries. However, the average level of milk production per cow is lower because there is great variation in the sophistication of technology of dairy units; this often relates to the size of units - the larger, the higher the level of technology - and to the fact that much of Canadian milk production is industrial milk being produced only from pasture on a seasonal basis.

Genetic merit in the best Canadian herds compares well with the best in the world. Artificial insemination (AI) is being used by approximately 50 percent of Canadian dairy farmers, as is the case in the United States, but it is well below that practised in countries like Israel where the figure is 80 percent. There is growing evidence that the Canadian dairy industry is falling behind the enviable purebred cattle export position it enjoyed just a few years ago. Apart from the fact that bull testing programs could be improved the technological reasons for this may be fourfold:

(1) genetic merit is often under-utilized by improper feeding and management techniques;
(2) the effort towards breed improvement is fragmented between AI units, breed associations, Record of Performance (ROP) and dairy herd improvement programs;
(3) more professional back-up is needed at the point of application of the technology;
(4) not enough emphasis is placed on yields and the level of milk recording in the field is low.

Feeding and management techniques are excellent in good herds but at relatively low levels in much of the seasonally produced industrial milk sector. Most milk production is based on forages; however, the better herds are fed substantial amounts of grain and protein supplements. Conservation of forages is a major item requiring more attention; in this context, there is a continuing need for evaluating new feeds and conservation methods. Non-protein nitrogen is utilized at only a small part of its potential.

Canada's dairy herd meets a very high standard (including United States standards) in contagious disease control, allowing breeding stock to be exported to more than 25 countries. In order of decreasing importance, the major problems which still remain are mastitis, reproductive failure including neo-natal deaths, and metabolic disorders such as ketosis and bloat.

Canadian climatic conditions require high-cost buildings during seven months of the year for food storage and the protection of animals, and costly storage/handling equipment. This is reflected in the high capital investment per cow ($950). Buildings generally meet high standards of protection and sanitation, but ventilation is still a problem in cold climates.

There is an effective transfer of technology from the United States and other advanced countries in physiology, nutrition, management and genetics. Canadian research programs are chiefly conducted in universities and Agriculture Canada research stations. Important areas under development include reproductive techniques such as twinning, embryo transfer and synchronization of oestrus. Research is necessary to solve specific problems related to the nutritional composition of crops in different regions, to environmental and climatic problems (ventilation) and to the genetic merit of the Canadian herd.

10.2.4 Resource Utilization

Canadian dairy production is based primarily on forages, grown to a great extent on class 3 and 4 land not generally suited to other crops. Forages provide for animal maintenance, growth of replacement stock and levels of milk yield up to 11.4 kilograms per cow per day. Above this level of production, recommendations are that concentrates (grain and supplements of protein, vitamins and minerals) be fed at an estimated average rate of one kilogram of concentrate for every 2.5 kilograms of milk produced. As such, yearly consumption of concentrates by the dairy herd averages approximately 1.5 million tonnes, of which some 1.1 million tonnes are fed as both energy and protein supplements, while others as protein supplements only.

The recent high prices of cereal grains have encouraged milk producers to use more roughages; the economics of feed supplies will determine the proportions of roughages and concentrates used. Increased attention is being given to the use of waste materials such as liquid whey and solid food-processing wastes.

Land requirements for grain represent between 0.4 and 0.8 million hectares. On average, it is estimated that each dairy cow monopolizes 0.4 hectare of land for grain crops, 0.8 hectare of pasture and 1.2 hectare of forages for hay and silage, such that the total dairy industry land base is 5.2 million hectares.

An estimated $6.5 billion is invested in this land base. Total capital investment per dairy cow is estimated to average $3,000, consisting of $1,600 for the land base, $450 for the livestock and $950 for buildings and equipment. The total investment in buildings and equipment on a national basis is about $2 billion.

It is estimated that each dairy cow implies about 80 man-hours per year, including the time required to care for young animals. This, however, excludes the additional 30 man-hours per cow that are needed for growing feeds, whether these be homegrown or purchased.

Examination of cost account data from a group of Ontario industrial milk farms provides a good picture of resource utilization by individual dairy farms. The income and expenses for these farms are presented in Table 10.3 for the period 1970-75. These farms are larger and have higher levels of production

Table 10.3 INCOME AND EXPENSES FOR REPRESENTATIVE ONTARIO INDUSTRIAL MILK FARMS, 1970 TO 1975

	1970		1971		1972		1973		1974		1975	
	Per Farm	Per Cow	Per Farm	Per Cow	Per Farm	Per Cow	Per Farm	Per Cow	Per Farm	Per Cow	Per Farm	Per Cow
FARM CHARACTERISTICS												
No. of cows	31.8	-	28.8	-	29.9	-	36.2	-	36.6	-	39.7	-
Total milk sold (kg)	134485	4234	121929	4234	140951	4714	155101	4285	123524	4612	20323	5096
Price per cwt	5.05		5.59		5.11		6.61		8.88		10.98	
RECEIPTS												
Value of milk sold	14970	471	14995	520	18945	634	22540	623	33009	902	48876	1231
Dairy livestock sales	2236	70	3914	136	2831	95	3368	93	4887	134	3963	100
Other cash receipts	731	23	688	24	1068	36	1405	39	3113	85	2541	64
Equals Total cash receipts	17937	564	19597	680	22846	764	27314	754	41009	1120	55380	1395
Plus change in inventory	±1743	55	±2357	82	±2821	94	±7901	218	±4091	112	±1280	32
Equals Total receipts	18681	619	21954	762	25667	858	34216	973	45100	1232	56660	1427
EXPENSES												
1. Purchased livestock & feeds	5549	175	6229	28	6233	208	10137	280	8697	238	10856	273
2. Homegrown feeds	2636	83	2768	96	3183	106	3512	97	4844	132	6897	173
3. Purchased supplies & services	-	-	-	-	-	-	-	-	-	-	7370	186
4. Hired labour	301	10	335	12	447	15	777	21	963	26	2779	70
5. Farm overhead expenses	-	-	-	-	-	-	-	-	-	-	4717	119
6. Interest & taxes paid	874	27	1008	35	1487	50	1093	30	2780*	76*	3859*	97*
7. Undistributed expenses	3276	103	3035	105	3498	117	3830	106	-	-	-	-
Equals Total cash expenses	12636	397	13375	464	14848	497	19349	534	26108	713	36478	919
Plus Family labour	-	-	-	-	-	-	-	-	-	-	-	-
Plus Depreciation	2684	84	2540	88	3400	114	4046	112	5624	154	7944	200
Equals Total expenses	15320	482	15916	553	18248	610	23395	646	31732	867	44422	1119
Net Cash Income (cash receipts - cash expenses)	5301	167	6222	216	7998	267	7965	220	14901	407	18902	476
Returns to cap., labour & mgmt. (Total returns - total expenses)	4361	137	6038	210	7418	248	11820	327	13368	265	12238	308
Minus Interest on equity (at 7.5%)	3229	101	3651	127	4054	136	5475	151	7179	196	10977	276
Equals Return to operator's labour & mgmt.	1132	36	2387	83	3365	113	6345	175	6189	169	1261	32
Capital Investment	54707	1720	62120	2157	73880	2471	87573	2419	114386	3125	173027	4358
Capital appreciation per year	5670	178	9402	326	10872	364	18912	522	54550	1490	-	-

* Interest only through 1973.

Source: Ontario Milk Marketing Board.

than the average, but for reasons of comparability and continuity of data, they represent the best estimates currently available.

From the table, it is observed that the major cash expense items are purchased feeds and home-grown feeds. Hired labour and interest payments are relatively minor cash expenses. Large non-cash expenses are depreciation and return to owners equity. These non-cash expenses are approximately equal to the major cash expenses of purchased food and home-grown feed.

The striking conclusion that can be made from the table is that capital investment per farm more than tripled from 1970 to 1975, even though the average size of farm at the end of 1975 was only slightly greater than in 1970. Of this increased investment, a small part was accomplished with owned resources (expansion of cow numbers and production per cow) but the major part resulted from changing prices of outputs (milk) and owned resources (land, buildings, livestock, machinery). This means that the average annual return from increased value of farm assets ($11,890) was greater than the average annual net income ($8,601) reported over the five-year period.

10.2.5. Comparison With Other Countries

Productivity and Industry Structure

Of 19 specified milk-producing and trading countries in Western Europe, North America, Oceania and Japan, Canada ranked seventh in importance in total milk production in 1974, eighth in number of milk cows and ninth in yield per cow (Table 10.4).

Production per cow in Canada at 3675 kilograms per annum was considerably below that of Japan (5416 kilograms) and the United States (4676 kilograms). It should be noted that yield per cow in British Columbia in 1974 was 5587 kilograms, substantially above the national average. However, direct comparison of total milk production per cow between countries may be questioned as there are often discrepancies in the methodology used in each case.

Although figures are not exactly comparable because of different census years and breakdown of herd sizes, Canada ranked fifth among specified countries having the largest percentage of farms with herds of 20 milk cows and over (Table 10.5). About 63 percent of farms in the United Kingdom had herds this size, followed by the Netherlands (49 percent), the United States (45 percent) and Canada (32 percent). Canada's relative position has improved greatly since 1956 when about 10 percent of the herds were of 20 cows and over. Australia and New Zealand lead all countries in the Western World in herd sizes.

With reference to the efficiency of dairy research input, Canada lags slightly behind the United States and the EEC from the point of view of reproductive physiology. As Canadian

Table 10.4 NUMBER OF MILK COWS AND YIELD[a], ECONOMIC REGIONS AND SELECTED COUNTRIES 1961-1965 AVERAGE and 1974

Area/Country	Number of Cows 1961-5	Number of Cows 1974	Yield/Cow 1961-5	Yield/Cow 1974
	- 000 head -		- kilograms -	
I Developed				
Market Economies	62,961	58,009	3,037	3,516
North America	19,125	13,301	3,424	4,515
- Canada	2,930	2,080	2,858	3,646
- U.S.A.	16,195	11,221	3,636	4,676
Western Europe	36,988	37,695	2,917	3,258
- France	9,830	10,050	2,557	2,951
- West Germany	5,853	5,463	3,525	3,953
- Italy	3,396	3,795	2,738	2,694
- U.K.	3,443	3,382	3,484	4,171
Oceania	5,225	4,627	2,375	2,714
- Australia	3,226	2,502	2,116	2,755
- New Zealand	1,998	2,125	2,793	2,666
Other Developed Market Economies (Israel[b], Japan, South Africa)	1,624	2,386	3,335	3,592
II Developing Market				
Economies	68,053	78,410	573	633
Africa	13,017	15,232	322	326
Latin America	20,811	17,425	927	986
- Argentina	2,339	3,500	1,840	1,761
- Brazil	7,865	9.730	748	753
- Mexico	2,430	3,157	950	1,113
Near East (mainly Arab States)	9,180	11,200	576	588
Far East	25,005	24,507	409	450
- India	18,933	17,300	429	487
Other Developing Market Economies (mainly small islands)	39	47	1,273	1,302
III Centrally Planned				
Economies	57,369	63,643	1,655	2,107
Asia	6,533	6,900	445	530
- China	6,120	6,353	452	545
Europe and U.S.S.R.	50,837	56,743	1,810	2,299
- Poland	5,988	6,237	2,151	2,732
- U.S.S.R.	37,252	42,300	1,716	2,175
IV World	188,383	200,062	1,726	1,938

[a]Total milk production divided by the number of cows reported.
[b]The highest milk yield was recorded in Israel, with an average production per cow of 5,311 kilograms in 1974.

Source: FAO statistics in Dairy Facts and Figures, 1976 (Dairy Farmers of Canada).

Table 10.5 STRUCTURE[a] OF DAIRY HERD IN SELECTED COUNTRIES, SELECTED YEARS, 1969 to 1974

Country	Year	Number of herds	Percent of Herds in Each Size Group 1-9	10-19	20-29	30-49	50 & Over	Total
		' 000	- percent -					
Canada[b]	1971	145,000	47.0	21.0	14.0	13.0	5.0	100
U.S.A.[c]	1969	453,000	26.0	29.0	11.0	23.0	11.0	100
Germany	1973	630,000	65.8	25.6	6.3	2.0	0.3	100
France	1973	697,000	53.4	31.9	10.2	3.9	0.6	100
Italy	1973	607,000	88.4	7.0	2.3	1.2	1.1	100
Netherlands	1974	99,000	24.3	26.2	21.2	20.2	8.1	100
Belgium	1973	85,000	50.0	32.4	11.6	5.3	0.7	100
Luxembourg	1974	4,000	34.8	34.1	19.3	10.9	0.9	100
United Kingdom	1974	88,000	19.6	17.2	14.3	21.3	27.6	100
Denmark	1974	77,000	37.1	34.9	15.6	9.9	2.5	100
Irish Republic	1973	144,000	66.6	18.4	8.0	5.1	1.9	100
Australia	1974	62,000	-	-	-	10.0	90.0	100
New Zealand	1972	29,000	-	-	-	-	69.0	100

[a]Size groups for Canada, U.S.A. and Oceania adjusted to conform to EEC breakdown and not strictly comparable.
[b]Cows two years and over kept mainly for milk purposes.
[c]Farms with sales of $2,500 and over.

Sources: (1) United Kingdom Milk Marketing Board, EEC Dairy Facts and Figures, 1975.
(2) Statistics Canada, Census of Agriculture, 1971
(3) United States Department of Agriculture, Census of Agriculture, 1969.

exports of live animals are falling, there is growing evidence that the country is also falling behind with respect to developing the genetic merit of its dairy herd.

Competitive Advantages and Disadvantages

Because of climatic conditions, the cost of producing milk in Canada is relatively high, particularly for feed and labour. In some regions such as British Columbia and in certain areas in Southern Ontario and Quebec, land values are relatively high. Canada has some advantages over western european countries in price and availability of feed grains. Market prices for industrial milk in Canada in 1976 were less than in the EEC but greater than in the United States. Australia and New Zealand, because of favorable climatic conditions have comparative advantages in milk production where the costs of feed, labour and stabling is concerned.

10.2.6 Beef from the Dairy Herd

Published markets information on the numbers of cattle and calves slaughtered and the numbers of beef carcasses graded is not broken down to show the numbers that are of dairy origin. Any statistic on the output of beef from dairy animals is therefore only an estimate.

In 1975, estimates were that 26.8 percent of all slaughterings were from dairy animals, down from 45.4 percent in 1950 (Table 10.6). The figures shown by province for cattle slaughtered represent all the cows reported in the province in which they were graded in the D3 and D4 grades in recent years or the U2, U3 and manufacturing grades in earlier years. The numbers reported in these two grades have been used on the assumption that the numbers of cows, steers and heifers of dairy origin falling into the other grades would balance out cattle of beef origin reported in the D3 or U2 and U3 grades. The calf slaughter figures have been adjusted to estimates of dairy calf numbers through the use of predetermined ratios of dairy to beef percentages in each of the provinces based on the traditional patterns of calf marketings and the average weights of the calves marketed, i.e., ratios of dairy to beef calves marketed: British Columbia 20 to 80, Quebec 95 to 5.

The Holstein, the major Canadian breed has the largest mature size. It thus contributes significantly to beef production through the culls of young animals which grow rapidly and convert feed to flesh very efficiently. It is considered that the Holstein calf is underutilized for meat.

10.2.7 Marketing and Pricing of Milk

In 1975, only 6 percent of the total milk production was used on farms for human consumption and livestock feeding, compared with 13.5 percent in 1950; this decrease has resulted from increased specialization by Canadian farmers. Farm use of whole

Table 10.6 DAIRY CATTLE OUTPUT IN EXPORTS OF BREEDING STOCK AND CATTLE AND CALVES SLAUGHTERED, CANADA, SELECTED YEARS, 1950 TO 1975

	Exports	Estimated Slaughterings by Province					Total Slaughtered	% of all Cattle & Calves Slaughtered	Total Dairy Cattle Output
		B.C.	Prairies	Ontario	Quebec	Maritimes			
		- number of head -							
1950									
Cattle	46,599	17,928	139,175	92,408	127,824	11,871	389.206	30.3	435,805
Calves	25,588	6,212	42,069	112,470	347,469	36,575	544,795	70.4	570,383
Total	72,187	24,140	181,244	204,878	475,293	48,446	934,001	45.4	1,006,188
1955									
Cattle	20,481	15,296	127,170	85,859	140,575	10,830	343,730	20.2	364,211
Calves	4,027	4,356	41,227	138,394	372,232	39,182	595,391	71.9	599,418
Total	24,508	19,652	168,397	224,253	476,807	50,012	939,121	37.1	963,629
1960									
Cattle	16,568	11,364	195,774	115,860	120,781	8,146	451,925	23.3	468,493
Calves	30,712	3,358	33,689	101,777	361,685	10,353	510,862	71.7	541,574
Total	47,280	14,722	229,463	217,637	482,466	18,499	962,787	36.2	1,010,067
1965									
Cattle	24,887	15,957	323,282	183,451	180,254	13,608	716,552	26.2	741,439
Calves	60,940	6,105	36,922	149,087	450,628	10,814	653,556	73.0	714,496
Total	85,827	22,062	360,204	332,538	630,882	24,422	1,370,108	37.7	1,455,935
1970									
Cattle	80,119	7,723	165,276	114,942	168,368	10,730	467,039	17.3	547,158
Calves	137,076	672	8,986	97,193	313,989	3,663	424,503	85.0	551,579
Total	207,195	8,395	174,262	212,135	482,357	14,393	891,542	27.9	1,098,737
1975									
Cattle	21,135	14,828	230,059	116,996	126,782	14,971	503,636	15.1	524,771
Calves	227	393	16,820	169,014	382,137	5,828	574,192	84.2	574,419
Total	21,362	15,221	246,879	286,010	600,724	20,700	1,077,828	26.8	1,099,190

Sources: (1) Statistics Canada, Cat. 65-202.
(2) Health of Animals Branch, Agriculture Canada.

milk also varies from region to region and can be expected to become highly available in the future. Additionally, the skim milk from about 5 percent of all milk is retained on the farm by cream shippers; this had decreased dramatically from about 40 percent in 1950 (Figure 10.1).

Farm Sales

Farm sales of milk and cream, in milk equivalent, in Canada, rose from 5,746 million kilograms in 1950 to 7,534 million kilograms in 1975, an increase of 31 percent (Table 10.7). The greatest percentage increase in the 25-year period occurred in British Columbia, 70 percent, followed by Quebec, 66 percent, and Ontario, 31 percent. Declines in farm sales occurred in the Prairie Provinces and the Maritime Provinces, amounting to 15 and 12 percent respectively.

Sales of milk for fresh fluid use (milk and cream) in Canada rose by 33 percent from 1950 to 1975 (Table 10.8). Increases occurred in all regions with the largest percentage increases occurring in British Columbia, 83 percent followed by the Prairie Region, 41 percent; Ontario, 40 percent, the Maritimes, 28 percent; and Quebec, 8 percent. Usage for fluid milk has increased from 28 to 31 percent of the total milk production (Figure 10.1).

Data for industrial milk sales prior to 1959 are not available. Farm sales of milk for industrial use in Canada rose from 2,107 million kilograms in 1959 to 4,603 million kilograms in 1975, an increase of 118 percent. The largest increase occurred in Quebec (1,214 million kilograms) followed by Ontario (417 million kilograms).

Industrial cream sales have been trending downward for several decades. Cream sales, in milk equivalent, in 1975 were 408 million kilograms compared to 2,689 million kilograms in 1959. Quebec and British Columbia are almost out of the farm-separated cream industry. Ontario deliveries are declining rapidly. A considerable volume of farm-separated cream is still being marketed in the Prairie Provinces but deliveries are declining sharply as farmers retire or switch to industrial milk.

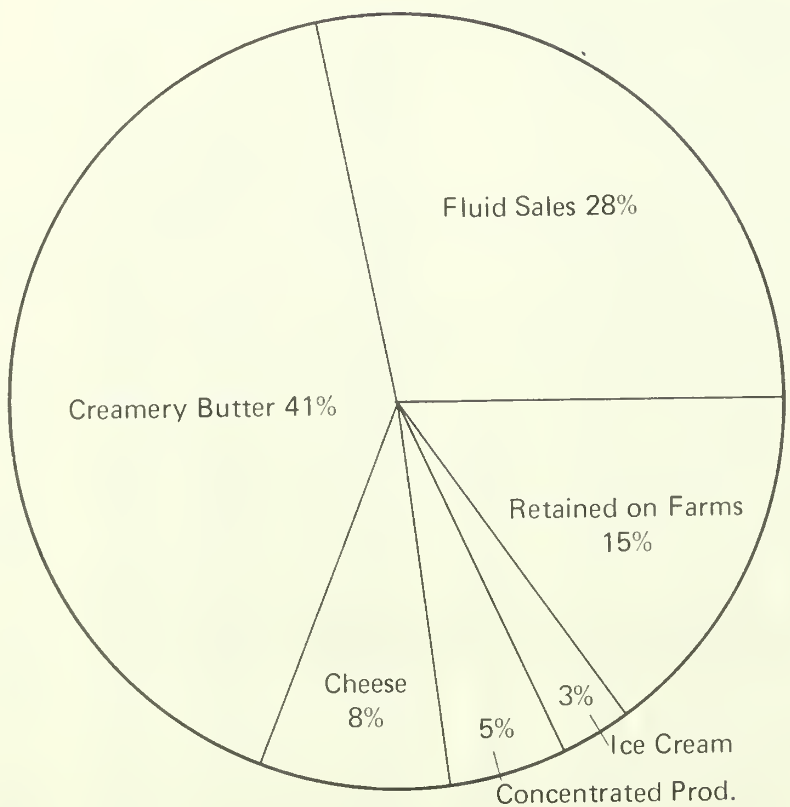
Management of Milk Supplies

The Boards and Commissions which have been established at the federal and provincial levels to control and administer the production of milk have varying powers and responsibilities, resulting from variations in type of milk production in different regions and from the different authorities vested in them. The marketing of fluid milk in Canada is under the jurisdiction of provincial authorities while industrial milk marketing is controlled by the CDC, a federal agency.

The responsibility and mechanisms for marketing fluid milk differ among the provinces. The various provincial milk acts

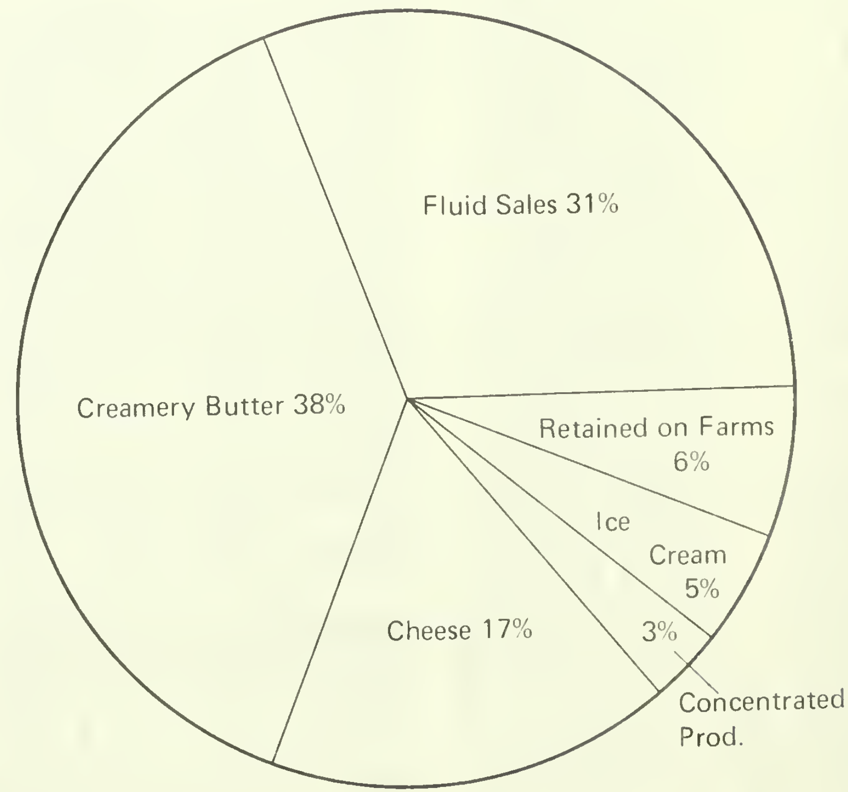
FIGURE 10.1 MILK UTILIZATION, CANADA, 1950 AND 1975

1950



Total Production 6.8 million tonnes of milk equivalent

1975



Total Production 8.1 million tonnes of milk equivalent

Source: Statistics Canada, Cat. 23–201.

Table 10.7 MILK PRODUCTION AND UTILIZATION BY REGION, CANADA, 1950 TO 1975

	Farm Butter*	Farm Home Consumed	Fed to Livestock	Sales off Farms	Total Milk Pro-Duction	Farm Butter*	Farm Home Consumed	Fed to Livestock	Sales off Farms	Total Milk Pro-duction	Farm Butter*	Farm Home Consumed	Fed to Livestock	Sales off Farms	Total Milk Pro-duction
	- million kilograms -														
	Maritimes					Quebec					Ontario				
1950	41	52	14	372	479	37	131	64	1781	2007	32	106	95	2070	2302
1955	21	53	24	425	522	24	124	76	2315	2538	11	102	100	1070	2566
1960	8	39	23	393	462	11	114	102	2447	2673	9	93	110	2548	2760
1965	4	31	14	272	421	4	97	96	2559	2752	3	87	133	2945	3169
1970	3	15	11	337	366	3	54	83	2981	3121	3	48	113	2724	2888
1971	1	12	11	220	244	2	46	82	2921	3051	2	42	111	2608	2759
1972	1	12	10	332	357	2	46	83	2875	3006	2	43	114	2560	2900
1973	1	12	9	316	339	2	43	89	2729	2863	1	41	124	2566	2731
1974	-	10	10	311	331	-	40	98	2786	2883	-	39	122	2588	2715
1975	-	9	11	329	350	-	38	102	2962	3102	-	38	136	2712	2886
	Prairies					British Columbia					Canada				
1950	160	183	91	1249	1682	8	15	11	274	207	291	496	274	5733	6811
1955	46	203	86	1326	1706	5	15	11	321	352	158	500	297	6741	7683
1960	70	199	97	1420	1786	3	12	14	255	385	106	458	346	7162	8066
1965	28	173	96	1217	1614	1	11	13	359	385	40	400	352	7553	8342
1970	19	104	91	1173	1387	1	9	13	409	431	30	229	311	7625	8193
1971	18	96	91	1130	1334	1	8	12	421	441	26	204	307	7405	7041
1972	19	95	84	1134	1328	5	8	11	424	444	24	204	301	7506	8035
1973	13	87	87	112	1294	5	7	13	427	448	18	188	320	7151	7676
1974	-	76	83	1026	1185	-	7	16	441	464	-	171	320	7151	7641
1975	-	57	81	1064	1202	-	7	21	467	496	-	149	352	7534	8035

*Consumed in farm homes.

Source: Canadian Dairy Commission.

Table 10.8 TOTAL FARM SALES IN MILK EQUIVALENT BY REGION, CANADA, 1950 TO 1975

	Fluid Sales	Industrial Milk	Industrial Cream Sales	Total** Sales	Fluid Sales	Industrial Milk	Industrial Cream Sales	Total** Sales	Fluid Sales	Industrial Milk	Industrial Cream Sales	Total** Sales
	- million kilograms -											
	Maritimes*				Quebec				Ontario			
1950	137	n.a.	n.a.	371	573	n.a.	n.a.	1781	718	n.a.	n.a.	2070
1955	168	n.a.	n.a.	425	691	n.a.	n.a.	2315	842	n.a.	n.a.	2627
1960	172	48	171	393	661	930	856	2447	887	1161	500	2548
1965	170	109	93	373	661	1171	644	2559	943	1565	436	2945
1970	161	65	111	337	612	2150	220	2981	966	1561	196	2724
1971	167	68	94	330	618	2144	160	2921	975	1476	153	2604
1972	171	73	88	333	615	2157	103	2875	1004	1580	158	2741
1973	172	71	74	316	630	2020	77	2729	1018	1423	126	2566
1974	177	72	61	311	643	2096	47	2786	1028	1442	118	2588
1975	177	114	38	329	621	2325	16	2962	1007	1596	109	2712
	Prairies				British Columbia				Canada			
1950	284	n.a.	n.a.	1249	164	n.a.	n.a.	274	1878	n.a.	n.a.	5746
1955	355	n.a.	n.a.	1326	179	n.a.	n.a.	321	2234	n.a.	n.a.	6741
1960	356	105	959	1420	205	150	n.a.	355	2281	2301	2485	7162
1965	366	98	852	1317	224	135	n.a.	359	2365	3161	2026	7553
1970	368	193	612	1173	256	153	n.a.	409	2364	4122	1138	7625
1971	375	205	550	1130	264	157	n.a.	421	2398	4050	957	7405
1972	388	241	505	1134	274	150	n.a.	424	2452	4201	853	7506
1973	399	281	432	1112	285	143	n.a.	427	2504	3937	709	7151
1974	405	314	307	1026	299	142	n.a.	441	2551	4065	534	7151
1975	401	402	261	1064	301	167	n.a.	467	2507	4603	407	7534

*Includes milk equivalent of farm butter.
**Excludes Newfoundland.

Source: Canadian Dairy Commission.

and their regulations generally provide for the licencing of producers and vendors, the control of milk quality, the establishment of minimum sanitary standards, the establishment of fluid milk prices, and the classification of milk by utilization.

Based on historical production, the CDC allocates to each province the right to produce a certain volume of industrial milk and cream called market sharing quota (MSQ), and each province distributes this quota amongst its producers. Fluid producers have the opportunity to market their excess milk under the MSQ system and consideration is given to this volume of milk when the MSQ is allocated to the provinces. The allocation of milk supplies for manufacturing purposes is the responsibility of the Canadian Milk Supply Management Committee, a group with representation from all provinces.

Thus, the MSQ system balances supply of milk with demand for milk products and prevents the cyclical periods of over- and undersupply historically characteristic of the dairy industry. Farmers with MSQs for industrial milk can plan their production more effectively, and difficult to manage carry-overs of perishable milk products are minimized. Oversupply, resulting in surpluses, is usually exported at world prices.

Canadian Industrial Milk Formula

The Industrial Milk Returns Adjustment Formula was instituted in April 1975 as part of the long term Dairy Policy. Its objective is to measure, at regular intervals, changes in the cost of cash inputs in the production of manufacturing milk. It is composed of three major components which are assigned weights: a cash input index (45 percent), an operator and family labour earnings index (35 percent) and a judgement factor based on supply and demand (20 percent) (Table 10.9). The judgement factors are under the discretion of the government and are meant to be set with regard to the accumulation or decumulation of stocks of dairy products, the prices of dairy products on world markets, and the domestic prices of manufactured dairy products.

This formula triggers a change in industrial milk prices whenever a 4 percent change in the formula occurs in any quarter. The formula indicated a target industrial milk price of $11.02 per hundredweight in the 1975/76 dairy year and $11.45 in the 1976/77 dairy year. It has not resulted in any quarterly changes within a dairy year.

Farm level pricing

Farm level prices of milk used for industrial purposes is the sum of:

(1) the return from the market

Table 10.9 INDUSTRIAL MILK RETURNS ADJUSTMENT FORMULA, CANADA, 1975

Formula Component	Proxy (Eastern Canada FIPI)	Weight	Base Value
Cash Input Items			
Grains & concentrates	16% dairy ration	13.4	112.2
Breeding fees	Art. insemination	0.6	114.1
Veterinary			
Other livestock expenses	Other materials and services	7.8	119.7
Haulage & fees			
Machinery repairs	Machinery repairs	3.1	136.9
Auto expenses			
Gas and oil	Petroleum Products	2.0	123.2
Machine hire	Custom Work	0.4	143.1
Lime & fertilizer	Fertilizer	3.1	98.0
Seeds, plants	Seed	1.9	108.0
Other crop expenses			
Land & building repairs	Building repairs	1.4	158.1
Property taxes and Insurance	Property taxes	2.8	136.1
Hydro & telephone	Electricity	1.9	120.3
Hired labour	Hired labour, monthly rated	6.6	197.3
Total Cash Input Items		45.0	-
Operator & Family Labour Earnings	CPI	35.0	174.0
Judgement Factors	-	20.0	-
Total, Industrial Milk Returns Adjustment Formula		100.0	-

Source: Canadian Dairy Commission.

(2) the direct subsidy paid by the CDC
(3) minus the In-Quota levy to defray the cost of skim milk powder disposal (Table 10.10).

Each of these components is administratively set. The return from the market is determined by the value of butter and skim milk powder produced by a hundredweight of milk (4.25 and 8.0 pounds) each valued at CDC support prices. Processing costs are subtracted from the value of product at the CDC to each producer based on his shipments within his individual MSQ. Industrial milk producers, cream shippers and fluid producers each have an individual MSQ to cover that proportion of their milk which goes to industrial uses. The In-Quota Levy is collected by provincial market authorities through deductions from the receipts from the market place. The levies are then remitted to the CDC to defray the cost of storage and disposal of skim milk powder through a five-year cost equalization fund.

Fluid milk pricing is under provincial jurisdiction. Fluid milk producers must hold quotas for production of milk for fluid uses. The excess of their production over fluid needs (and a small overrun required for seasonal adjustment of the fluid market) is sold as industrial milk subject to MSQ. Fluid milk prices are somewhat influenced by effective prices for industrial milk inasmuch as it is difficult for fluid production to command a premium over industrial production of more than $1.00 to $1.50 per hundredweight. As a consequence, federal support policies have de facto set the price of all milk in Canada. (Table 10.11)

10.2.8 Regional Variations

Traditionally, fluid milk production has tended to locate close to major population centers. Over the past 20 years, transportation has become less of a factor in location of fluid milk production. Recent federal pressure to achieve greater integration of the fluid and industrial markets is improving the distribution of fluid production within provinces in relation to efficiency of land use.

Canada has a generous endowment of class 3 and 4 lands for which dairy production is well-suited, such that the industry would be much larger and incomes would be severely depressed in the absence of rational policies. Much of this land is located in Eastern Ontario, Quebec and the Maritimes. Areas where dairy production has been displaced by more land intensive enterprises include Southern Ontraio and British Columbia (except for fluid production to supply local demands at premium prices). In the prairies, dairy production does not compete well with more labour-extensive enterprises such as beef production nor with the more land-intensive grain production.

Thus, regional differences in total production and in relative importance of the fluid and industrial milk markets are

Table 10.10 INDUSTRIAL MILK PRICES, CANADA, 1972/73 TO 1976/77

	1972/73	1973/74	1974/75	1975/76	1976/77
1. CDC Support Prices					
Butter	.68	.71	.77/.85	1.03	1.08
Skim Milk Powder	.29	.35/.38	.50/.54	.64	.68
2. Gross Value of Product/cwt	5.21	5.82/6.06	7.27/7.93	9.50	10.03
3. Minus Processing & Transport Margins/cwt	.77	.72/.81	1.07/1.08	1.14	1.24
4. Equals Farm Value from Market/cwt	4.44	5.10/5.25	6.20/6.85	8.36	8.79
5. Plus Direct Subsidy/cwt	1.25	1.45/2.01	2.30/2.56	2.66	2.66
6. Minus In quota Levy/cwt	.10	.30	.10	.15/.65	1.35
7. Equals In quota Effective Price/cwt	5.59	6.25/6.96	8.40/9.31	11.02/10.52	10.10
8. Minus Market Price Over Quota Levy/cwt	2.05/1.50	1.50/2.06	1.50	3.50	8.60
9. Equals Over quota Effective Price/cwt	2.39/2.94	3.60/3.19	4.86	0.19	
10. Quota Binding or Not	SEQ Binding	SEQ Binding	MSQ Not Binding	MSQ Not Binding	MSQ Not Binding

Source: Canadian Dairy Commission.

Table 10.11 PRICES OF MILK FOR FLUID USES, BY PROVINCE, CANADA, 1975/76 AND 1976/77

Province	1975/76	1976/77
	- cwt -	
Prince Edward Island	11.57	12.15
Nova Scotia	12.18	13.08
New Brunswick	11.97	12.86
Quebec	12.30	12.30
Ontario	12.01	12.01
Manitoba	11.60	12.30
Saskatchewan	11.70	11.70
Alberta	11.83	12.59
British Columbia	14.30	14.46

Source: Canadian Dairy Commission.

substantial (Table 10.12). Quebec produces 39 percent and Ontario 36 percent of total production. Quebec is quite specialized in the production of industrial milk and cream, with 75 percent of its production being used for manufactured dairy products.

10.2.9 Farm Income

The sale of milk and cream accounts for 15-17 percent of total farm receipts (Table 10.13). When sales of cull dairy cows and calves are added, the primary dairy sector accounted for between 17.5 and 19 percent of total farm receipts. Dairying in Quebec represented 52-57 percent of total farm income. In British Columbia, it accounted for 30-32 percent of total farm receipts, in Ontario and the Maritimes roughly 23-26 percent. In the prairies, dairying is least important relative to total agriculture, accounting for only 4 percent of total farm receipts. In Ontario and the prairies, approximately 55-60 percent of production goes for industrial use. The Maritimes and British Columbia are primarily fluid markets with the bulk of their industrial utilization arising from seasonal excess production.

Average provincial farm receipts reflect the utilization of the milk. The prairies have the lowest average farm value, reflecting the higher proportion of farm-separated cream produced. Quebec is the next because of its high proportion of industrial milk. Ontario, the Maritimes, and British columbia each have progressively higher average farm values reflecting steadily higher utilizations as fluid milk. The average farm value of milk and cream (including net subsidy) for all of Canada was approximately $8.32 in 1974 and $10.06 per hundredweight in 1975.

It is estimated that about half of the dairy producers must rely on other farm enterprises or off-farm income to supplement their income. The opportunities for supplementary farm enterprises and non-farm sources of income vary widely between regions. In areas with good agricultural alternatives, dairying is found as a supplementary enterprise or coupled with supplementary form enterprises such as crop production. In less favourable areas, off-farm sources of income are used to supplement dairy incomes on small farms. Since dairy production is labour-intensive, requiring several hours each day during winter, and full time during the summer, the opportunities for off-farm working are not nearly as good for dairy farmers as for other agricultural enterprises such as crop or beef production. Because of this, small-scale dairy farmers with low family incomes are much more common than comparable cases in non-dairy enterprises.

10.3 SECONDARY INDUSTRY

Milk was one of the first agricultural commodities to have a significant secondary processing industry with the

Table 10.12 ESTIMATES OF DAIRY PRODUCTION BY SEVERAL MEASURES OF REGIONAL PRODUCTION, CANADA, 1974 AND 1975[a]

Item	Maritimes 1974	Maritimes (1975)[b]	Quebec 1974	Quebec (1975)	Ontario 1974	Ontario (1975)	Prairies 1974	Prairies (1975)	B.C. 1974	B.C. (1975)	Canada 1974	Canada (1975)
Number of milk cows (1000)	90	(96)	930	(950)	620	(640)	354	(357)	83	(90)	2080	(2133)
Percent	4.5	(4.5)	44.7	(44.6)	29.8	(30.0)	17.0	(16.7)	4.0	(4.2)	100.0	
Total milk production (mil. kg)	331	(342)	2883	(3089)	2715	(2823)	1185	(1231)	464	(503)	7577	(7990)
Percent	4.4	(.43)	38.1	(38.7)	35.8	(35.3)	15.6	(15.4)	6.1	(6.3)	100.0	
Milk production per capita (kg)	165	(160)	474	(501)	342	(351)	330	(338)	200	(214)	343	(358)
Implicit production per cow (kg/cow)	3558	(3584)	3100	(3251)	4379	(4411)	3346	(3446)	5586	(5586)	3643	(3746)
Milk sold off farms (mil. kg)	310	(329)	2786	(2962)	2588	(2712)	1026	(1064)	441	(467)	7151	(7534)
Total milk receipts[c] ($000)	58	(71)	514	(674)	465	(592)	172	(213)	97	(118)	1309	(1668)
Implicit average farm value[c] ($/cwt)	8.50	(9.82)	8.38	(10.34)	8.17	(9.92)	7.62	(9.10)	10.00	(11.48)	8.32	(10.06)

[a]Implicit production per cow, implicit farm value and milk sold off-farms are distributions of the national figures.
[b]1975 figures in parentheses are preliminary estimates.
[c]Including net subsidy.

Source: Canadian Dairy Commission.

Table 10.13 DAIRY RECEIPTS BY REGION, CANADA, 1974 and 1975[a]

Item	Maritimes		Quebec		Ontario		Prairies		B.C.		Canada	
	1974	(1975)	1974	(1975)	1974	(1975)	1974	(1975)	1974	(1975)	1974	(1975)
						- $ million -						
Receipt from milk & cream	52	(64)	404	(547)	399	(515)	141	(174)	92	(112)	1088	(1412)
Supplemental Dairy payments	6	(7)	110	(127)	66	(77)	34	(39)	5	(6)	221	(256)
Receipts from sale of dairy livestock	10	(8)	87	(74)	79	(65)	30	(23)	16	(13)	222	(183)
Total dairy receipts	68	(79)	601	(748)	544	(657)	205	(236)	113	(131)	1531	(1851)
Total farm receipts	292	(297(	1161	(1309)	2414	(2612)	4626	(5174)	373	(404)	8867	(9796)
Total dairy receipts as a percent of total farm receipts	23.3	(26.6)	51.7	(57.1)	22.5	(925.1)	4.4	(4.6)	30.3	(32.4)	17.3	(18.9)

[a]1975 figures in parentheses are preliminary estimates.

Source: Canadian Dairy Commission.

establishment of cheese and butter factories in the 1860's. Canadian dairy farming is served by a secondary industry that has undergone and is undergoing tremendous evolutionary changes.

10.3.1 Industry Structure

In the early years of this century, Canada had thousands of milk-processing plants, necessitated by limitations of transportation to horse-drawn vehicles and by the perishability of the product without refrigeration. Most of these plants have now disappeared, and plants processing more than 450 tonnes of milk per day are common (estimated at 24 in 1976.). These larger plants have resulted chiefly from improved transportation and on-farm refrigeration and have allowed for economies of scale. Bulk tanks are the most recent farm innovation making it relatively easy to keep milk at 4° C without bacterial degradation while it is being shipped long distances. Refrigerated transport facilities also enable the distribution of highly perishable dairy products between provinces, again enabling production to be concentrated in one large plant.

In 1975, there were estimated to be 608 plants in Canada (Table 10.14), many of these being multi-purpose plants. The size of these plants varies according to a number of factors: availability of and competition for milk; commodity produced, e.g., cheddar cheese and butter lending themselves to large plants; market for the product, e.g., some specialty cheeses in small plants. Rationalization and consolidation of plants is continuing but at a smaller rate than previously.

10.3.2 Technology

Increased use is made of mechanisation and automation to reduce labour costs and human error in such areas as: mechanized cheese-making; evaporator and drier operation; continuous butter manufacture; integrated fat-standardizing separators, pasteurizers and packaging machines for fluid milk; ice-cream and frozen-dessert specialties; and cleaning-in-place systems.

The level of technology in dairy processing is reasonably good. Some examples of what is used are: instantizing skim milk powder, UHT-processing of sterile products in a small way, continuous cheese- and butter-making, specialized cultures for yoghurt, nonhygroscopic whey powder, production of butter-margarine blends and low-fat spreads. Advanced technology not being used includes production of special skim milk powders for specific end-uses, caseins and co-precipitates, whey protein concentrates (not lactalbumin), and some other whey-based products such as have been developed and used in the Netherlands. Most of the equipment processing technology, and ingredients (starter cultures, milk-coagulating enzyme gums, stabilizers, flavours) are imported and as a consequence, Canada is a follower in technology. Most research is devoted to quality

Table 10.14 REGISTERED DAIRY PLANTS BY REGION AND BY PRODUCTS MANUFACTURED, CANADA, 1974 AND 1975*

		No. of Plants Manufacturing											
District	Year	Butter	Cheddar Cheese	Skim Milk Powder	Evap. Milk	Fluid Milk	Var. Cheese	Inst. Dry Milk	Ice Cream	Proc. Cheese	Cottage Cheese	Yoghurt	Total No. of Plants
Maritimes	1974	18	4	6	3	17**	0	0	17	0	5	1	47**
	1975	17	5	6	3	43	0	0	27	0	6	1	72
Quebec	1974	76	54	29	6	40**	24	2	39	6	16	18	158**
	1975	57	44	25	2	61	16	2	35	7	13	15	181
Ontario	1974	51	45	16	7	92	30	7	50	5	22	6	231
	1975	45	39	14	6	83	39	7	46	6	21	5	223
Prairies	1974	71	18	7	3	56	7	0	29	1	14	9	134
	1975	60	14	7	3	52	10	0	27	1	16	8	109
B.C.	1974	6	2	1	1	9	1	1	13	0	6	5	23
	1975	5	2	1	1	12	1	1	14	0	6	5	23
CANADA	1974	222	123	59	20	214	62	10	158	12	63	39	593
	1975	184	104	53	15	251	66	10	149	14	62	34	608

*These are not official figures.
**Estimate only.

Source: Statistics Canada, Cat. 32-209.

improvement and the application of technology from elsewhere. The major areas of concern are development of new products utilizing skim milk and whey, improvement of shelf-life, conservation of energy, pollution and waste disposal.

10.3.3 Production and Consumption

Tables 10.15 and 10.16 give a review of dairy products output and consumption since 1950.

Fluid Milks and Related Products

Since 1950, the total production of fluid milks has increased steadily from 1.9 to 2.5 million tonnes. Part of the increase in production has been a result of decreased consumption on the farm of milk produced there and store purchases by farmers.

Within that period there were slight decreases in per-capita consumption during the early 1960's, followed by approximately constant per-capita consumption. In 1975, there was again a decrease, attributed to price increase of about 15 cents per litre (28 percent). Statistics show a constant total consumption of 2.5-2.7 million tonnes since 1950 (fluid-sales-off-farm plus farm-home consumption).

A dramatic and important shift has been from standard milk (about 3.3 percent fat) to partially skimmed milk (usually 2.0 percent fat). From minimal production in the 1950's, two-percent milk almost equalled that of standard milk in 1975, and in some markets greatly surpassed it. Reasons for the change are attributed to a combination of lower cost (1-2 cents per litre) and of general consumer attitudes towards less fat in the diet. This shift has allowed an additional 483 million kilograms of fat (as whole-milk equivalent) to be diverted from two-percent to fluid creams and other fat-rich products; it has helped to narrow the gap in consumption between fat and nonfat components.

Production and sale of skim milk, chocolate dairy drink and buttermilk have remained fairly static, which means decreased per-capita consumption. Creams are considered a fluid product. Milk used for their production has remained static between 340 and 410 million kilograms since 1950. Although sales of sour cream have increased dramatically since 1950, per-capita consumption of cream has decreased reflecting the competition from substitute whipped toppings and coffee whiteners; a trend away from fat products by calorie-conscious consumers may also be involved.

Butter

Output of creamery butter in Canada has trended downward in the past 25 years, reflecting the decline in consumption. Creamery butter output in Ontario and Quebec has increased substantially. Output in the prairie region and the Maritimes has

Table 10.15 TOTAL OUTPUT OF DAIRY PRODUCTS BY REGION, CANADA, 1950 to 1975

	Maritimes[a]						Quebec					
	Creamery Butter	Cheddar Cheese	Other Cheese	Evaporated Whole Milk	Ice Cream Mix[b]	Skim Milk Powder	Creamery Butter	Cheddar Cheese	Other Cheese	Evaporated Whole Milk	Ice Cream Mix[b]	Skim Milk Powder
	- million kilograms -											
1950	8	1	-	n.a.	.5	-	40	10	1	n.a.	1	9
1955	10	.5	-	n.a.	.5	.5	57	8	1	n.a.	2	17
1960	7	1	-	n.a.	1	.5	56	17	2	n.a.	2	37
1965	6	1	-	n.a.	1	1	60	28	3	n.a.	3	51
1970	5	2	-	n.a.	1	1	72	34	9	n.a.	4	111
1971	4	2	-	n.a.	1	1	62	46	10	n.a.	4	93
1972	4	2	-	n.a.	1	1	63	41	9	n.a.	4	105
1973	3	2	-	n.a.	1	1	55	46	9	n.a.	4	99
1974	3	3	-	n.a.	1	1	50	47	21	n.a.	4	96
1975	3	3	-	n.a.	1	2	66	34	20	n.a.	4	128

	Ontario						Prairies					
	Creamery Butter	Cheddar Cheese	Other Cheese	Evaporated Whole Milk	Ice Cream Mix[b]	Skim Milk Powder	Creamery Butter	Cheddar Cheese	Other Cheese	Evaporated Whole Milk	Ice Cream Mix[b]	Skim Milk Powder[c]
	- million kilograms -											
1950	32	32	1	n.a.	2	13	38	2	-	n.a.	1	2
1955	38	27	1	n.a.	3	19	38	1	-	n.a.	1	4
1960	39	31	4	n.a.	4	36	41	1	-	n.a.	2	5
1965	50	41	6	n.a.	4	46	37	2	-	n.a.	2	4

[a]Includes Newfoundland. [b]Million litres. [c]Includes British Columbia.

Table 10.15 TOTAL OUTPUT OF DAIRY PRODUCTS BY REGION, CANADA, 1950 to 1975
(Concl'd)

	Ontario						Prairies					
	Cream-ery Butter	Cheddar Cheese	Other Cheese	Evapo-rated Whole Milk	Ice Cream Mix[b]	Skim Milk Powder	Cream-ery Butter	Cheddar Cheese	Other Cheese	Evapo-rated Whole Milk	Ice Cream Mix[b]	Skim Milk Powder[c]
	- million kilograms -											
1970	42	36	13	n.a.	5	45	28	3	-	n.a.	3	7
1971	36	34	16	n.a.	5	36	26	4	-	n.a.	3	7
1972	40	36	16	n.a.	5	42	25	6	-	n.a.	3	8
1973	34	31	16	n.a.	5	31	21	6	-	n.a.	3	10
1974	34	30	19	n.a.	5	32	17	7	-	n.a.	3	9
1975	39	34	18	n.a.	5	44	18	8	-	n.a.	4	14

	British Columbia						Canada					
	Cream-ery Butter	Cheddar Cheese	Other Cheese	Evapo-rated Whole Milk	Ice Cream Mix[b]	Skim Milk Powder	Cream-ery Butter	Cheddar Cheese	Other Cheese[d]	Evapo-rated Whole Milk	Ice Cream Mix[b]	Skim Milk Powder
	- million kilograms -											
1950	2	.5	-	n.a.	.5		149	45	2	116	6	24
1955	3	.5	-	n.a.	1		145	36	4	134	7	40
1960	2	.5	-	n.a.	1		146	50	6	144	9	78
1965	1	.5	-	n.a.	1		154	72	10	141	12	101
1970	2	1	-	n.a.	1		149	76	23	116	14	164
1971	2	1	-	n.a.	1		131	87	26	120	14	137
1972	2	1	-	n.a.	2		132	87	26	110	14	156
1973	2	11	-	n.a.	2		115	86	27	106	14	141
1974	2	1	-	n.a.	2		106	88	42	101	14	138
1975	3	1	-	n.a.	2		129	80	41	91	15	187

[b] Million litres. [c] Includes British Columbia.
[d] Includes a small quantity produced in regions other than Ontario.
Source: Statistics Canada, Cat. 32-002.

Table 10.16 DOMESTIC DISAPPEARANCE OF DAIRY PRODUCTS AND MARGARINE, CANADA, 1950 to 1975

TOTAL

	Fluid Products[a]	Creamery Butter	Cheddar Cheese	Other Cheese Milk	Evaporated Whole	Ice Cream[b]	Skim Milk Powder	Margarine
	- million kilograms -							
1950	2373	126	15	4	109	108	21	43
1955	2735	137	21	6	131	144	36	57
1960	2739	132	23	11	142	185	56	76
1965	2765	162	31	17	136	234	63	78
1970	2593	149	40	32	118	270	61	91
1971	2602	150	41	37	116	270	50	91
1972	2656	144	42	37	111	275	47	96
1973	2693	133	50	40	106	275	52	99
1974	2721	132	46	58	97	275	58	111
1975	2656	120	46	58	91	284	63	123

PER CAPITA

	Fluid Products	Creamery Butter	Cheddar Cheese	Other Cheese	Evaporated Whole Milk	Ice Cream[c]	Skim Milk Powder	Margarine
	- kilograms -							
1950	177.61	9.17	1.05	0.28	7.94	7.7	1.55	3.11
1955	178.81	8.73	1.31	0.38	8.35	9.3	2.33	3.64
1960	157.21	7.37	1.29	0.58	7.96	10.4	3.12	4.25
1965	144.05	8.22	1.55	0.85	6.92	11.8	3.21	3.94
1970	124.63	6.99	1.88	1.49	5.51	12.6	2.84	4.24
1971	123.46	6.92	1.87	1.71	5.37	12.5	2.29	4.20
1972	124.59	6.59	1.91	1.71	5.09	12.6	2.15	4.41
1973	121.70	6.03	2.24	1.82	4.76	12.4	2.35	4.47
1974	124.05	5.88	2.06	2.58	4.40	12.3	2.58	4.87
1975	119.51	5.24	5.24	2.54	4.00	12.5	1.26	5.26

[a]Includes fluid sales plus milk and cream consumed in farm homes.
[b]Million litres.
[c]Litres.

Source: Statistics Canada, Cat. 21-513.

declined by more than 50 percent while the relatively low production in British Columbia has not changed appreciably. The decline in the prairies is due largely to the exodus of cream shippers from the industry. In the Maritimes, the decline in butter output is attributed to the growth of fluid sales and cheese production, together with a decline in total milk output.

Per-capita domestic disappearance of creamery butter, despite subsidies which had the effect of reducing increases in retail prices, has been trending downward since 1950. Per-capita consumption of margarine has been gradually increasing. Total per-capita consumption of the two spreads, creamery butter and margarine, has declined moderately during the 25-year period. Consumption of farm butter which was around one kilogram per-capita in 1950 is almost non-existent today.

Cheese

Output of cheddar cheese has expanded in all regions in the past 25 years, with the greatest volume increase occurring in Quebec. Ontario, historically the leading producer, has not increased output significantly since the 1950's, although there was an upward movement in production in the second half of the 1960's in response to export demand. Cheddar production in Quebec expanded more than six-fold from an average yearly output of 7 million kilograms in the 1950-54 period to 43 million kilograms in 1971-75. This increase was due to the consolidation and/or up-grading of existing cheese factories, the construction of new up-to-date facilities and a substantial increase in total milk output.

Output of whole milk cheese other than cheddar has increased from 2.3 million kilograms in 1950 to a high of 42 million kilograms in 1974. In 1975, some 52 varieties of cheese other than cheddar were made in Canada. Cottage cheese, a low-fat cheese, increased to more than 23 million kilograms per year, using 131 million kilograms of milk on a nonfat solids basis in 1975.

Per-capita consumption of cheese, both cheddar and other whole milk varieties, has increased substantially since 1950, with cheddar almost doubling and other cheese increasing nearly nine-fold.

Evaporated Milk

Production of evaporated whole milk in Canada has been trending downwards due to inability to compete on export markets because of price. In addition, there has been a decrease in per-capita consumption, thought to be due chiefly to wider availability of fresh milk.

Ice Cream

Production and consumption have been increasing in all parts of Canada at a greater rate than the population. In 1975, per-capita consumption was 10.6 litres. Growth of ice milk has been slow and now takes about 3 percent of the market. Ice cream is an important user of fat, and to a lesser extent, nonfat solids. Because of the high price of the latter, there has been a substitution of about 25 percent of it with whey solids. This is about the maximum substitution that can be achieved without significant flavour changes.

Skim Milk Powder

Production of skim milk powder, a by-product in the manufacture of butter has increased almost eight-fold since 1950. Over 90 percent of the skim milk powder production occurs in Quebec and Ontario, with Quebec showing the greatest increase - from 9 million kilograms in 1950 to 128 million kilograms in 1975. This great expansion in output stems from the decline in the number of cream shippers who retained the skim milk on the farm for livestock feeding. For each kilogram of butter made from whole milk separated at the factory, there are about two kilograms of skim milk powder produced.

An alternative use for skim milk is in the production of casein, an important product in Canada from 1961 to 1971 when the yearly average production amounted to 7.5 million kilograms. However, because of a decline in prices on world markets, only one company is currently making casein and production data are not available. It requires about three and one-half times as much skim milk to make one kilogram of casein as to make one kilogram of skim milk powder, thus it is an important product in milk utilization.

Domestic disappearance of skim milk powder trended upward from 1950 to about 1969, but has been on the downturn since. Skim milk powder for industrial use is being replaced by cheaper sources of protein such as soybean meal and whey powder. High prices $1.50/kg seriously limit this market. Skim milk powder in consumer-sized packages has had a federal subsidy since October 1973.

Yoghurt

The Cinderella dairy product in recent years has been yoghurt, which rose in output from less than 3.8 million litres in 1968 to 13.7 million litres in 1975. However, yoghurt production utilizes relatively small quantities of milk (about 17 million kilograms on a milk equivalent basis of nonfat solids).

Whey

Whey is a by-product of cheese manufacturing. A survey in 1973 revealed that the 1.1 million tonnes of whey were handled as follows: 43 percent was disposed of in waste disposal systems, spraying on fields, etc.; 8 percent was fed to animals; and about 49 percent was processed to powder (23 million kilograms) and other products (34 million kilograms of powder equivalent). In 1975, whey powder production was 5 percent higher than in 1973, at 27 million kilograms. Whey disposal is a problem. Statistics on whey utilization are not available. Significant quantities are fed to animals in both liquid and dried form; it is an ingredient in ice cream (estimated at 4.6 million kilograms of whey solids) and used in the baking industry as a replacement for skim milk powder.

Prospects for improved utilization of whey are: wider use as a food ingredient, production of whey protein concentrates and wider use of liquid whey for animal feeding to obviate the expensive process of drying; the latter is presently estimated at 18-26 cents per kilogram of powder (it is worth 11-15 cents per kilogram as an animal feed). Nonhygroscopic whey powder for edible uses sells at 37-53 cents per kilogram. Importation of whey in differentiated forms for food and feed is believed to be increasing due to advances in technology elsewhere.

Elasticity of Demand

The demand for some milk products is more prone to changes in price than for others (Table 10.17). Butter is the most price-elastic, showing a greater decrease (1.5 percent) in demand for an increase (1.0 percent) in price; this has extremely important implications in pricing policies. Powder has a price-elasticity of about 1.0. Price-elasticities for cheese have tended to decrease, whereas those for fluid milk have tended to increase and both are about 0.5. Cheese is also income-elastic, showing about an equivalent increase in consumption to that of income, whereas the reverse is true for skim milk powder. As expected, sales of butter are affected by the price of margarine, and sales of powder as animal feed, by the price of soybean meal. Sales of fluid milk are not appreciably influenced by the price of skim milk powder.

10.3.4 Substitute Products

Substitute products have a very real significance for the dairy industry.

Fully-Substituted Products

The major substitute product is margarine. Since its introduction in 1948, its consumption has increased steadily until, in 1975, it was 5.26 kilograms per-capita (Table 10.17), compared to 5.24 kilograms for butter. This represents a substitution of 2.8 billion kilograms.

Table 10.17 DIRECT PRICE AND INCOME ELASTICITIES, CANADIAN DEMAND FOR DAIRY PRODUCTS, SELECTED YEARS, 1957 TO 1976

Source	Period	Direct Price Elasticity	Income Elasticity	Cross Elasticity of Demand (Substitute Named)
	- Fluid Milk -			
Perkins et al.[a](1969)	1957-1966	-0.276	.83	
Sahi & Harrington(1974)	1958-1972	-0.32	.4882	
Hassan & Lu[b](1974)	1969			
D. King(1976)	1975	-0.57	0.44	Nil (Skimmilk powder)
	1976	-0.58	0.48	Nil (Skimmilk powder)
	- Butter -			
Perkins et al.(1969)	1957-1966	-1.242	-0.751	
Sahi & Harrington[c](1974)	1958-1972	-1.05	0.36	
Hassan & Lu[b](1974)	1969		0.1133	
Lu & Marshall[b](1974)	1969		0.22	
D. King(1976)	1975	-1.35	+0.41	+0.44 (Margarine)
	1975		+0.44	+0.44 (Margarine)
	- Cheese -			
Perkins et al.(1969)	1957-1966	-0.913	1.351	
Sahi & Harrington[d](1974)	1958-1972	-0.55	.64	
Hassan & Lu[b](1974)	1969		0.2523	
Lu & Marshall[b, e] (1974)	1969		0.65	
D. King(1976)	1975	-0.51	+0.94	
	1976	-0.56	+1.01	
	- Skim Milk Powder -			
Perkins et al. (1969)	1957-1966	-0.324	-0.922	
Sahi & Harrington(1974)	1958-1973	-0.23	0.104	
Hassan & Lu[a](1974)	1969		-0.175	
Lu and Marshall[b](1974)	1969		-0.72	
D. King(1976)	1975	-0.90	-1.20	+1.63(Soybean meal)
	1976	-1.04	-1.50	+1.80(Soybean meal)

[a]Fluid milk and cream. [c]Creamery butter. [e]Process cheese only.
[b]Cross-sectional sata. [d]Process and cheddar cheese only.

Another major area of substitution is in creams of various sorts - toppings and coffee whiteners, both liquid and dried. The advent of the single-portion of coffee creamers of long shelf life seems likely to have helped to arrest the rate of substitution. This suggests that careful study of the cream market might indicate ways to make creams 'more usable' or more convenient.

There has been considerable activity in developing blends of food constituents to produce liquid milk-like products, sometimes including whey or lactose. These are a reality in infant-formula foods. They also appear to be a reality in non-dairying countries and will serve increasingly as depressants on the world market for skim milk products. A blend of whey and vegetable proteins is a very strong competitor for skim milk powder as a food ingredient and in some applications for fluid uses; significant quantities are being produced in Canada and particularly in the United States.

Partially-Substituted Products

These have been available and produced around the world for many years. The best examples are fat-substituted milks and ice creams. These have and will serve real uses on the export market and help to utilize the world surpluses of skim milk.

On the domestic scene, blends of milk fat and margarine fats are on the butter market in Nova Scotia and Saskatchewan, but consumption data are not available. These are claimed to produce a better-flavored spread than margarine, to extend supplies in butter-deficient areas and to increase sales of dairy-oriented companies not selling margarine.

There is considerable interest in producing spreads containing blends of milk fat and of vegetable oils such as sunflower oil containing high levels of polyunsaturated fatty acids. These may meet new regulations for dietary products, but they are not likely to affect the market significantly for at least several years.

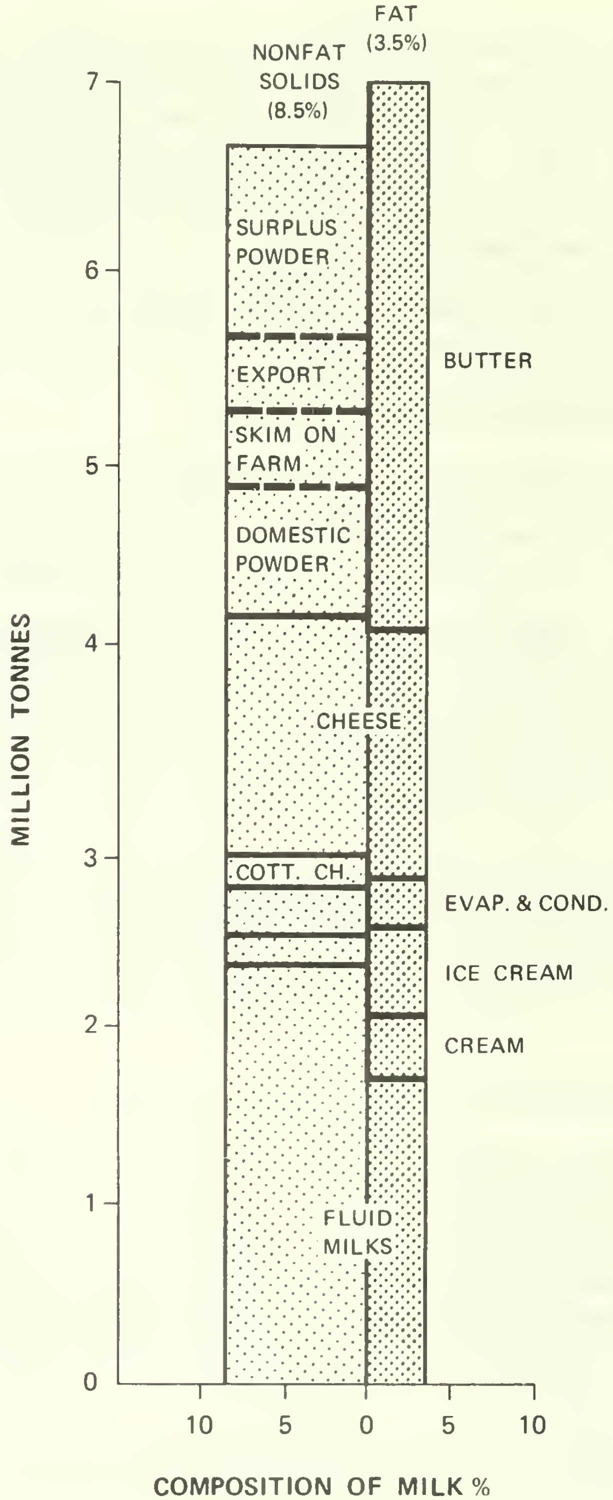
10.3.5 Utilization of Fat and Nonfat Solids

The dairy industry throughout the world, and in Canada, has traditionally been based on the fat of milk. In the early days, milk was bought and sold on the basis of fat as were most products, such as cheese and milk powder. It is interesting to speculate on cause and effect, but the marketing of dairy products had developed such that there is greater demand for the fat of milk than for the nonfat solids the (protein and lactose).

Figure 10.2 shows the current utilization of the fat and nonfat components of milk. An important feature revealed by this

FIGURE 10.2

UTILIZATION OF FAT AND NONFAT COMPONENTS IN VISIBLE MILK PRODUCTS, AS MILK EQUIVALENTS, CANADA, 1975



Source: Statistics Canada, Cat. 23–201.

histogram is that sufficient fat was skimmed from fluid milks in 1975 to produce the fluid creams and the additional fat needed for ice cream.

Nonfat components now yield more revenue than fat on a major share of the milk produced such that the dairy industry could usefully start an accounting of those components, either on a protein basis or on a nonfat solids basis.

Figure 10.3 traces the utilization of both the fat and nonfat portions of milk since 1950. The dotted line to the right of "domestic powder" is an approximation of the amount of nonfat solids used as human food in Canada. The balance has been exported as powder at values considerably less than the support price, or has been fed to livestock on farms (the skim milk from cream shipped from farms) or otherwise disposed of.

In 1950, 55 percent of nonfat solids were consumed, increasing to 60 percent in the 1960's and to 75 percent in the 1970's (Table 10.15). Per-capita consumption of nonfat solids has remained fairly constant throughout this period at 205-227 kilograms per annum of whole milk equivalent, compared to decreases from 447 to 316 kilograms per-capita of fat (as whole milk equivalent).

During this period, the per-capita consumption of nonfat solids as skim milk powder, cheese, cottage cheese and ice cream has increased, whereas, that of fluid, evaporated and condensed milk has decreased.

It is apparent from Figure 10.3 that it would be very difficult to balance domestic consumption of fat and nonfat solids in Canada without drastic reductions in consumption of butter and without drastic reductions in total milk production. It is however apparent (Figure 10.3 and Table 10.18) that the gap is closing.

The Holstein produces the lowest ration of fat to solids-not-fat. With increased production per cow, fat content tends to decrease and consequently this ratio. If all milk in Canada were produced by Channel Island breeds, with a composition of 5 percent fat and 9.2 percent solids-not-fat, Canada would be in a position of utilizing about 91 percent of the skimmilk produced domestically. This has important implications in pricing policies for fat and nonfat solids and in breed recommendations. However, because of the nature of the products currently produced, supply management means that 100 percent of the demand for milk fat is met, and only 75-80 percent of the other constituents (protein and lactose) is used as human food in Canada.

The present world price at which powder for human use must be exported is depressed at 35 cents per kilogram. The approximately equal value for the fat and nonfat portions in the

FIGURE 10.3 UTILIZATION OF FAT AND NONFAT COMPONENTS IN VISIBLE MILK PRODUCTS, AS MILK EQUIVALENTS, CANADA, 1950 to 1975

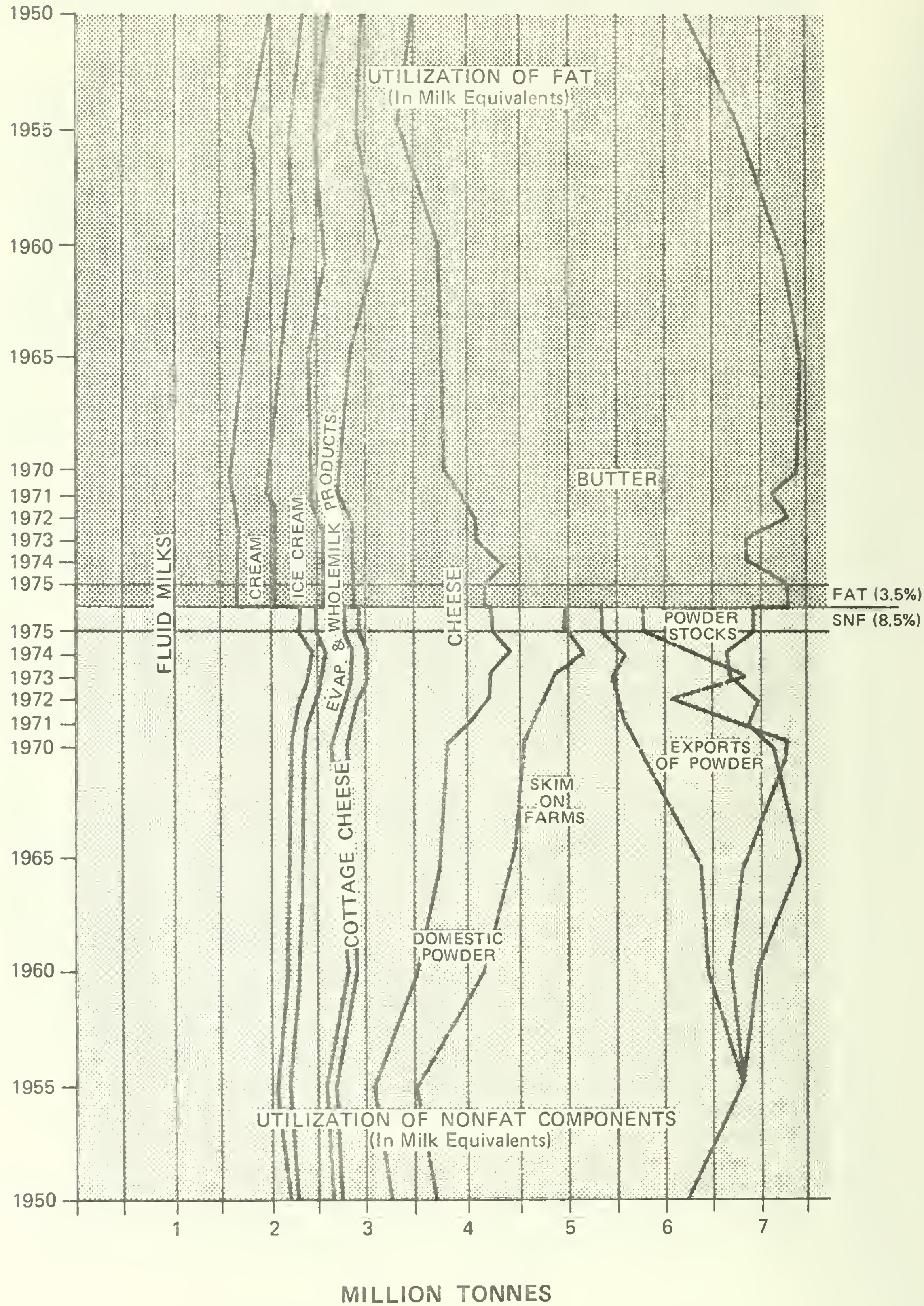


Table 10.18 USAGE OF NONFAT MILK CONSTITUENTS AS FOOD, CANADA, SELECTED YEARS, 1950 TO 1975

Year	Total Production as Milk Equivalent[a]	Visible Nonfat Solids Used as Food in Canada: Total (Milk Equivalents)	%	Per-Capita[c] Consumption of Domestically Produced Milk (as milk equivalent): Fat[b]	SNF
	million kg	billion kg	%	- kg -	
1950	6,136	3,388	55	447	247
1955	6,653	3,423	51	424	218
1960	6,820	6,074	60	396	228
1965	7,240	4,395	61	372	224
1970	7,240	4,506	62	341	211
1971	7,005	4,584	65	325	213
1972	6,739	4,656	69	328	213
1973	6,593	4,775	72	306	216
1974	6,560	5,081	77	301	226
1975	6,795	4,918	72	316	216

[a]Estimated from visible solids-not-fat, at 8.5 percent SNF.
[b]Estimated from visible fat, at 3.5 percent fat.
[c]Unrevised population figures for 1972-75.

Source: Statistics Canada, Cat. 23-201.

support prices means that powder must be heavily subsidized ($1.14/kilogram) for export. It has resulted in a hold-back of $2.86 per 100 kilograms($1.35/cwt) of manufacturing milk, or about 12 percent of the target price for all manufacturing milk.

The federal government has been heavily involved in maintaining the manufacturing milk industry through establishing support prices on butter, skim milk powder and cheese. Initially, support prices placed a higher value on the fat and a lower value on the nonfat portion (Table 10.19). In 1950, fat contributed 72 percent of the price of milk to the producer (before deducting processing and transportation costs and adding subsidies), while the nonfat portion accounted for 28 percent (from butter and powder support prices of $1.16 and 0.26/kg, respectively). Since then the relative prices have changed so that fat and nonfat solids of milk contribute 46 and 54 percent to the price received in 1975-77 (support prices of $2.38 and $1.50/kg, respectively). The change to a higher price value for the nonfat portion has helped to maintain domestic butter consumption by keeping prices relatively low and at the same time maintaining the market at a relatively constant level of total milk production in Canada. It has helped to convert cream producers to industrial milk producers and, by increasing price paid for the nonfat portion, increased returns to industrial producers.

The imbalance of domestic consumption of fat and nonfat solids remains a major dilemma to the dairy industry of Canada, as in most major dairy countries.

10.3.6 Distribution and Marketing

Methods of distribution and marketing of dairy products are very complex and vary widely depending on the product and the company. Some, such as milk powder and evaporated milk, are shelf-stable and are distributed as grocery items. Others, such as butter and cheese, are not as shelf-stable but can be stored for periods varying from weeks to months under refrigeration. Frozen desserts must be distributed in the frozen state. At the other end of the scale are the highly perishable items such as fluid milks, creams, yoghurts, cottage cheese, etc., which must be produced, distributed, sold and consumed within a matter of days; tremendous strides have been made in product quality and a shelf-life of 15-20 days is not uncommon. Distribution systems requiring more refrigeration and shorter times are generally more expensive. The prospect of distribution as a grocery product, without refrigeration, is an economic incentive to the introduction of sterile UHT-milk.

A major feature of the fluid milk market has been vertical integration, downwards from supermarkets to the processing level, and upwards from processing companies to the milk store.

Table 10.19 SUPPORT AND AVERAGE WHOLESALE PRICES FOR BUTTER, SKIM MILK POWDER AND CHEESE, CANADA, 1950 TO 1976

Year	Creamery Butter Aver. W'sale Price[a]	Creamery Butter Support Price[b]	Skim Milk Powder Aver. W'sale Price	Skim Milk Powder Support Price[b]	Cheddar Cheese Aver. W'sale Price	Cheddar Cheese Support Price[b]
			- cents/lb -			
1950	56.9	53.0	12.25	10.75	29.0	
1951	62.6	58.0[c]	16.50		35.0	28.0
1952	61.6	58.0	16.50		30.0	
1953	60.0	58.0	11.75	11.50	29.0	30.0
1954	59.4	58.0	9.87		29.0	30.0
1955	58.9	58.0	11.625		29.0	
1956	57.5	58.0	13.25	17.0	31.0	
1957	59.5	58.0	17.5	17.0	32.0	
1958	63.1	64.0	15.87	15.0	35.0	34.0
1959	63.6	64.0	12.37	10.0	36.4	32.0
1960	63.5	64.0	9.50		32.7	32.0
1961	63.0	64.0	7.75		33.4	32.0
1962	54.9	64.0	8.0	7.15	34.7	32.5
1963	50.8	64.0	10.87		36.6	32.5
1964	51.8	64.0	14.62	11.0	37.3	32.5
1965	54.3	64.0	15.25		40.1	35.0
1966	59.0	59.0	17.5		42.9	38.0
1967	62.5	63.0	19.8	20.0	45.3	38.0
1968	63.5	63.0	19.5	20.0	46.1	42.0-47.0
Sept 30'68		65.0				
1969	65.0	65.0	20.0	20.0	46.5	42.0-47.0
1970	65.0	65.0	20.0	20.0	47.6	42.0-47.0
1971	66.1	65.0	15.4	24.0	61.0	51.0
Aug 16'71		68.0		26.0		54.0
1972	68.0	68.0	29.5	29.0	63.6	54.0
1973	70.2	71.0	35.5	35.0	67.7	60.0
Aug 1'73				38.0		
1974	79.0	77.0	50.9	50.0	85.1	60.0
Aug 1'74		85.0		54.0		
1975	99.5	90.0	61.1	59.0	103.0	60.0
Jan 24'75		103.0		64.0		
1976		108.0		68.0		60.0

	Price % 1950	1956	1962	1967	1971	1976
% of price paid for fat	72%	64.2	82.4	62.2	58.7	44.4
% of price paid for non fat	28%	35.8	17.6	37.8	41.3	55.6

Note: Because of the lack of information on support prices, exact five-year intervals are not available.

[a]First grade solids.

[b]The Agricultural Stabilization Board did not provide a support price every year for cheese and skim milk powder.

[c]In August 1951, the Board was authorized to buy up to 10 million lbs @ 63¢

Source: Statistics Canada, Cat. No. 23-201.

This continuing integration is a second major effect on the structure of the industry.

There has been a tendency for 'disintegration' of the processing sector from the distribution sector, with products of longer shelf-life such as butter, cheese, powder and evaporated milk. These products are produced by companies specializing in their production and are sold either to chain stores as private labels or to companies specializing in merchandising with national distribution and advertising. A few cheese companies have successfully integrated vertically into their own retail outlets.

With some notable exceptions, such as the cheese area, market research, advertising and promotion for milk products have been generally considered to be very deficient. Increasing amounts have been done at the national level by the Dairy Foods Service Bureau and by the National Dairy Council of Canada and at the provincial level by some marketing boards. The prevailing opinion is that much more can and should be done but responsibility has not been clearly resolved.

10.3.7 International Marketing and Trade

The international market for dairy products is large. Estimates for 1975 were: butter, 940,000 tonnes; cheese, 990,000 tonnes; skimmilk powder, 824,000 tonnes. International trade represents 15 percent of world production for butter, 10 percent for cheese and 30 percent for skim milk powder. Trends in trade have been downward for butter, upwards for cheese, with powder fluctuating.

The market (prices) has seen a reversal in the past two years. During most of 1974, most countries maintained tight marketing and trade policies, balancing supply and demand. However, in 1975 this situation changed abruptly with prices on world markets falling (powder, from 21 to 6 cents/kg) and stocks of skim milk powder in developed countries rising to unprecedented levels. The over supply was due to three reasons: milk prices to producers were raised substantially in 1974-75 bringing about a moderate increase in output; high prices for powder resulted in more drying of powder and less feeding of liquid skim milk to animals; and, at the same time, consumer prices increased on domestic markets which reinforced the dampening effect of the economic recession on the demand for milk products in developed regions. Centrally planned countries have experienced some consumption increases which have occurred faster than production increases; however, this has had little effect on the world situation.

Various measures have been undertaken to balance milk markets in developed dairying countries. Those in vogue in 1974 and 1975 are listed in Table 10.20. They vary widely, from supply quotas to dairy/beef conversion, general subsidies, welfare

Table 10.20 MEASURES TO BALANCE MILK MARKETS IN DEVELOPED COUNTRIES, 1974 AND 1975[a]

	Measures Affecting production and marketing													
	Limitation of price guarantee by						Dairy cow slaughtering scheme		Dairy/beef conversion scheme		Levies on concentrates		Reduction of fodder area	
	holdback from producer price		delivery quotas: individual		delivery quotas: global									
	1974	1975	1974	1975	1974	1975	1974	1975	1974	1975	1974	1975	1974	1975
Australia			X[b]	X[b]										
Austria	X	X												
Canada	X	X+	X	X										
EEC									X					
Finland											X	X	X	
Japan					X	X								
New Zealand			X[b]	X[b]										
Norway									X		X	X		
Sweden											X	X		
Switzerland	X	X			X	X	X	X	X	X	X	X	X	X
United States			X[b]	X[b]										

	Measures affecting domestic consumption for food and feed								Measures affecting trade					
							Subsidies on							
	general subsidies[c]		welfare milk		special sales action		cheap milk products fed to animals		commercial exports: direct		commercial exports: indirect[d]		food aid	
	1974	1975	1974	1975	1974	1975	1974	1975	1974	1975	1974	1975	1974	1975
Australia	X								X		X		X	X
Austria	X	X	X	X	X	X	X	X	X	X			X	X
Canada	X	X									X	X	X	X
EEC	in U.K.&Ireland		X[e]	X[e]	X	X	X	X	X	X+			X	X+
Finland	X	X+							X	X			X	X
Japan	X	X	X	X										
New Zealand	X[f]	X[f]												
Norway	X	X+	X	X					X	X				
Sweden	X	X+	X	X							X	X		
Switzerland	X	X			X	X	X	X	X	X			X	X
United States			X	X										X

[a]As of July 1975
[b]Milk for liquid consumption only.
[c]Including subsidies on production having the combined effects of improving returns to producers and of reducing consumer prices.
[d]Pooling of returns from domestic and export sales, etc.
[e]Schemes on national or regional levels.
[f]Milk for domestic liquid consumption only. x+ and x- means measures intensified and reduced, respectively.

Source: Food & Agriculture Organization, Doc. CCP 75/10.

milk, subsidies as animal feed, export encouragement and food aid.

There is a GATT agreement on international marketing of dairy products. For skim milk powder (of most concern to Canada), it started at $180 (U.S.)/tonne in May 14, 1970, increased to $225 (U.S.)/tonne in 1971 and to $315 (U.S.)/tonne in December of 1973; these correspond to about 20, 24 and 35 percent/kilogram. Except for a brief surge to high prices, as high as $1.01/ kilogram in 1974, world prices have been at or near those levels.

A recent FAO document (DDl: G/76/45, June 1976) predicts an unfavorable demand for skim milk powder. It cites competition from vegetable and whey proteins even at current world prices of 35 cents/kilogram for powder and 15 cents/kilogram for whey. Further, the FAO document estimates that the skim milk from 20 percent of all the milk produced in the world is fed to animals either as powder or as liquid skim milk. This has decreased slightly since 1960, at a slightly faster rate in the so-called western countries; but it was still at 6.8 million tonnes in milk powder equivalent in 1975 (Table 10.21). This includes, at least for Canada, both skim milk and whole milk fed on the farm, the major share of which would be potentially available for human use. In view of the very high usage of skim milk as animal feed and the competition from other sources of both animal and human food, prospects for international skim milk powder prices rising above its value as an animal feed are not bright.

Cheese

Cheddar cheese, Canada's traditional export product, declined from 29 million kilograms in 1950 to about 2 million kilograms in 1975 (Table 10.22). There was a relatively brisk export market in the decade from 1962 to 1971, during which time average annual cheddar exports were 14 million kilograms. The entry of the united Kingdom into the EEC imposed a high import duty which virtually closed that market for two years. This, coupled with relatively high prices for Canadian cheese, has had an adverse effect on exports. Reentry into the EEC market has been negotiated but the total market is expected to be considerably smaller than previously. Imports have grown from 2.3 million kilograms in 1953 to 21 million kilograms in 1975.

Skim milk powder

Exports expanded from 4 million kilograms in 1950 to nearly 136 million kilograms in 1970. The availability of powder and the necessity for export have been due to the conversion of cream shippers to shippers of manufacturing milk. The amounts for export have been approximately 114 million kilograms annually since 1970. The export market in 1975 and 1976 has been sluggish due to extremely low world prices.

Table 10.21 FEED USE OF MILK AND MILK POWDER IN DEVELOPED AND CENTRALLY PLANNED COUNTRIES (IN MILK POWDER EQUIVALENT), 1976

Year	West Europe, N. Ammerica, Australia	Centrally Planned Countries	Total
		- 000 tonnes -	
1960	4,820	3,479	8,299
1965	4,691	4,237	8,828
1970	4,156	3,459	7,615
1971	3,789	3,751	7,540
1972	3,599	3,931	7,530
1973	3,856	4,216	8,072
1974	3,608	4,225	7,833
1975 (pre.)	3,430	4,115	7,545

Source: Food & Agriculture Organization, Doc. DDl: G/76/45.

Table 10.22 TOTAL EXPORTS AND IMPORTS OF DAIRY PRODUCTS, CANADA, 1950 TO 1975

	Creamery Butter	Cheddar Cheese	Other Cheese	Evaporated Whole Milk	Powder Whole	Powder Skim	Creamery Butter	Other Cheese
				- million kilograms -				
1950	1	29	-	16	4	4	*	-
1955	3	6	*	2	7	3	*	3
1960	1	9	*	1	16	22	*	6
1965	2	15	*	3	9	39	*	8
1970	*	14	1	6	*	135	*	12
1971	2	13	1	2	*	109	4	14
1972	*	8	1	1	*	52	2	15
1973	*	3	3	*	.5	122	28	17
1974	*	1	2	*	.5	59	25	21
1975	*	1	1	*	*	36	5	21

* Less than 500 tonnes.

Source: Statistics Canada, Cat. 65-202 and 65-203.

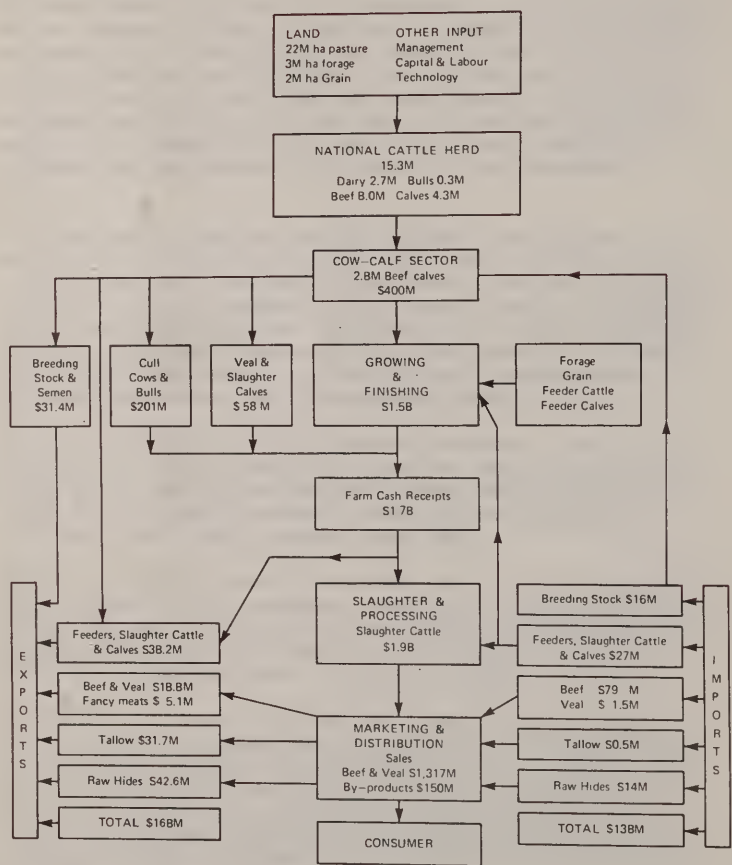
Other products

Exports of whole milk powder, which were significant until 1966, have been very small in recent years, due to decreased world trade in this commodity and particularly due to high Canadian prices. A similar situation has existed for evaporated milk.

Traditionally, Canada is not an exporter of butter. The exception was 1963 and 1964 when a total of 61 million kilograms was exported to relieve a burdensome surplus in Canada. World trade in 1975 was 846,000 tonnes and has been decreasing. In 1973 and 1974, it was necessary to import a total of 104 million kilograms of butter to look after domestic requirements. Considerable but unknown amounts of milk products (whey, skim milk and butter milk powders) are imported as calf milk-replacers and as differentiated milk products.

THE CANADIAN BEEF SYSTEM

1975



B Billion
M Million

1. The production, processing and merchandizing of beef is Canada's most important agricultural industry. In 1975, beef provided about 160,000 cattle producers with $1.7 billion in farm gate receipts and packing plant sales totalled $3.3 billion. Retail value of beef is estimated at approximately $4.4 billion.

2. Domestic consumption of beef averages approximately 45.5 kilograms per capita. It is the leading meat consumed by Canadians by an almost 2 to 1 margin. It makes a major contribution to the nutrition of Canadians as an excellent source of high–quality protein, minerals and vitamins. Present trends arising from consumer demands are toward leaner beef.

3. Beef production is based primarily on forages which account for 80 percent or more of the total feed required for beef cattle. Canada has a major rangeland resource of about 22 million hectares suited to cereal, oilseeds or other crops, but capable of efficiently producing forages for beef production. An additional estimated 4 million hectares is used for cultivated forages and cereal production.

4. Currently some 1.6 million hectares of grain are utilized for growing–fattening young animals. The trend is toward using more forage and less grain; if necessary, all beef could be produced on forage and waste products.

5. Beef cattle are produced from coast to coast but about 80 percent of the beef herds are located west of Ontario. Most of the "dairy" beef comes from Ontario and Quebec. Transportation plays a major role as most beef production areas are located far from consumption centres. Nearly half a million feeders are moved annually from the west to Ontario for finishing, and large numbers of carcasses are shipped from western abattoirs to eastern markets, chiefly Montreal.

6. Slaughter, processing and marketing of beef is a major segment of the food industry. The meat packing industry employs about 32,000 workers to process beef and generates more than $555 million in value added.

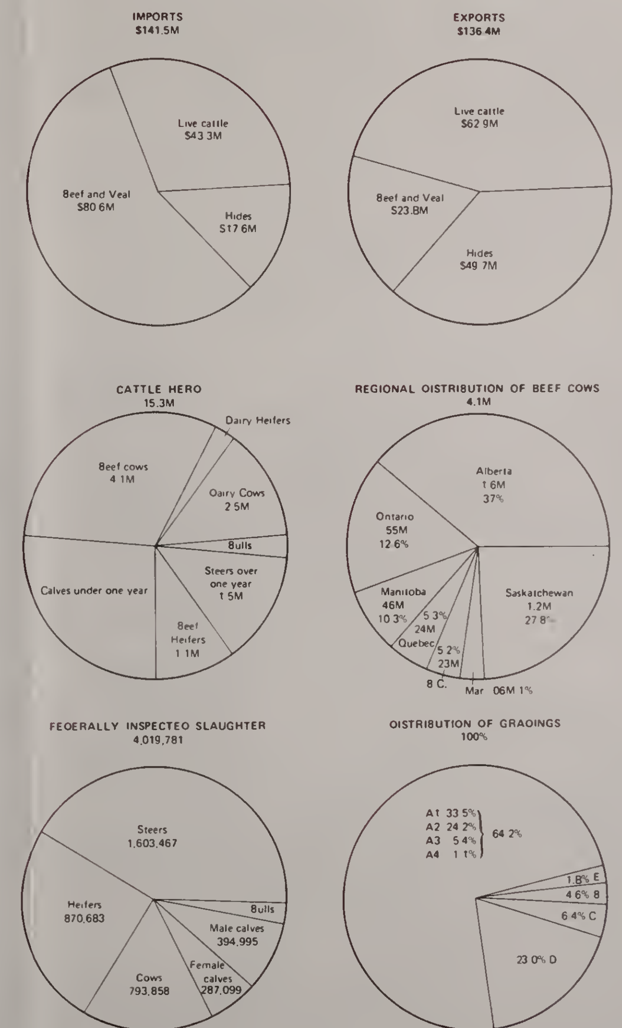
7. While beef production is primarily domestically oriented, there is a very substantial international trade. In 1975, exports amounted to $168 million and imports to $138 million. The main products traded are live cattle, manufacturing beef, tallow, hides and high quality cuts for the hotel, restaurant and institutional trade. Canada is normally a small net importer of beef (5–6 percent of total consumption). Canadian exports of breeding stock and semen are increasing.

8. Level of Canadian technology in production, processing and marketing is advanced but lags somewhat behind that of the United States. More research and development is needed to enable the industry to compete on the North American market.

9. The domestic marketing of beef is an open system with no marketing boards. Canadian beef competes with the United States in a North American market and price is determined chiefly by the larger United States market.

10. Major problems in the Canadian beef industry are stabilization, production of manufacturing grade beef, better use of dairy calves and beef import policies.

11. Canada has the potential to at least double most beef production through the use of another 23 million hectares of marginal and unimproved land, the use of waste materials (straw, wood etc.) for feed and the improvement of existing rangelands. There is good potential for developing export markets of selected beef products and breeding stock.



11. THE CANADIAN BEEF SYSTEM

11.1 INTRODUCTION

Beef has special importance to most Canadian homemakers in that it forms the basis of many meals and represents a relatively large part of consumer budgets. In the Consumer Price Index calculated by Statistics Canada, beef accounts for over 15 percent of expenditures on food consumed at home. The 1975 per-capita beef consumption was 46.4 kilograms compared with 21.8 kilograms of pork and 19.1 kilograms of poultry meat.

The beef industry (primary and secondary) is widely distributed across Canada, although concentrated in Alberta, Saskatchewan and Ontario. It creates a large number of jobs in the production, processing, merchandising, and consumer sectors; is an efficient method of utilizing the large Canadian resources of marginal agricultural land; has the potential for large-scale expansion as needed, and will continue to make a major contribution to the Canadian food supply in the foreseeable future.

The farm cash income from the sale of cattle and calves amounted to $1.7 billion in 1975. This was 17 percent of total national farm cash receipts, a drop from an average of close to 10 percent through the early 1970's, mainly due to a cyclical drop in beef cattle prices. In 1975, sales of beef cattle and calves were the major source of farm cash receipts in Alberta and Ontario, and second in British Columbia, Saskatchewan, Manitoba, Nova Scotia and Prince Edward Island.

The cyclical nature of cattle numbers, especially since the late 1940's, has been confined almost entirely to beef cattle. Dairy cattle numbers have declined almost continuously since World War II. There has been a continual and significant increase in beef cattle numbers since 1950.

Seventy to eighty percent of the beef cow herd is maintained in Western Canada on the extensive rangelands. Average production per cow is about 0.85 calf per year. When the calves are weaned, some remain with their owners but large numbers are marketed to other cattlemen to grow and finish.

The calves may be put into feedlots directly and fed high-energy rations to finish out for slaughter at 13-16 months of age at 455-520 kilogram liveweight, or they can be fed on forage (pastures and harvested forages), grown more slowly and finished in feedlots at a later age of 18-24 months with shorter high-energy feeding periods. Others can be grown and finished entirely on forages. The largest feedlot industry is in Alberta followed by Ontario.

In the secondary sector, the meat packing industry is the largest food processing industry in Canada, providing jobs for more than 32,000 Canadians. Beef accounts for about 70 percent of the volume output (tonnage) from the packing industry. Further-processing of beef and its marketing and distribution to consumers provides another large group of jobs and services.

Canada imports and exports beef as live cattle and meat. On balance, there is a small net import, amounting to about 5-6 percent of the total beef consumed.

11.2 THE PRIMARY SECTOR

11.2.1 Resource Utilization

Canada has a major resource base in the form of rangeland (about 20 million hectares in the west and 2 million in the east) suitable for forage production but not for other types of agricultural production. Beef production is an efficient means of converting these forage resources and many agricultural or industrial wastes to high-quality food products. In addition to the rangelands, an estimated 2.4 million hectares of hay, grass silage and corn silage, and about 1.6 million hectares of land for cereal are utilized to support the beef industry. The cereal area is based on a 2.2 to 4.4 million tonne (barley equivalent) requirement, primarily for growing and finishing young animals. Most of the grain is grown in Western Canada, but in Ontario large quantities of corn silage form the basis of the feedlot industry.

Potential for future expansion includes an estimated 20 million hectares of marginal land unsuited to arable crop production and large tonnages of waste materials such as cereal straws and forest product wastes. Productivity of large areas of existing pastures and rangelands could be tripled by re-seeding and better management. Full use of these basic resources would permit at least doubling the present beef herd and replacing a high proportion of the grain for growing and finishing with forage diets.

The number of beef cattle on Canadian farms has more than tripled since 1951, reaching 6.7 million in 1976 (Table 11.1).

11.2.2 Cattle Inventory and Breeds

Table 11.1 BEEF CATTLE ON CANADIAN FARMS, CANADA, SELECTED YEARS, 1951 TO 1976

Year	Cows	Heifers	Steers	Total
		-head-		
1951	1,068,000	416,000	606,300	2,090,300
1961	2,304,000	673,000	988,400	3,965,400
1971	3,436,500	1,061,200	1,192,500	5,690,200
1972	3,665,700	1,072,100	1,234,400	5,972,200
1973	3,973,100	1,168,400	1,332,400	6,473,900
1974	4,256,000	1,170,000	1,431,000	6,857,000
1975	4,293,300	1,179,400	1,449,400	6,922,100
1976	4,101,500	1,117,400	1,543,000	6,761,900

Source: Census of Agriculture Division, Statistics Canada.

Approximately 95 percent of the national beef cow herd is classified as 'commercial', or non-purebred cattle.

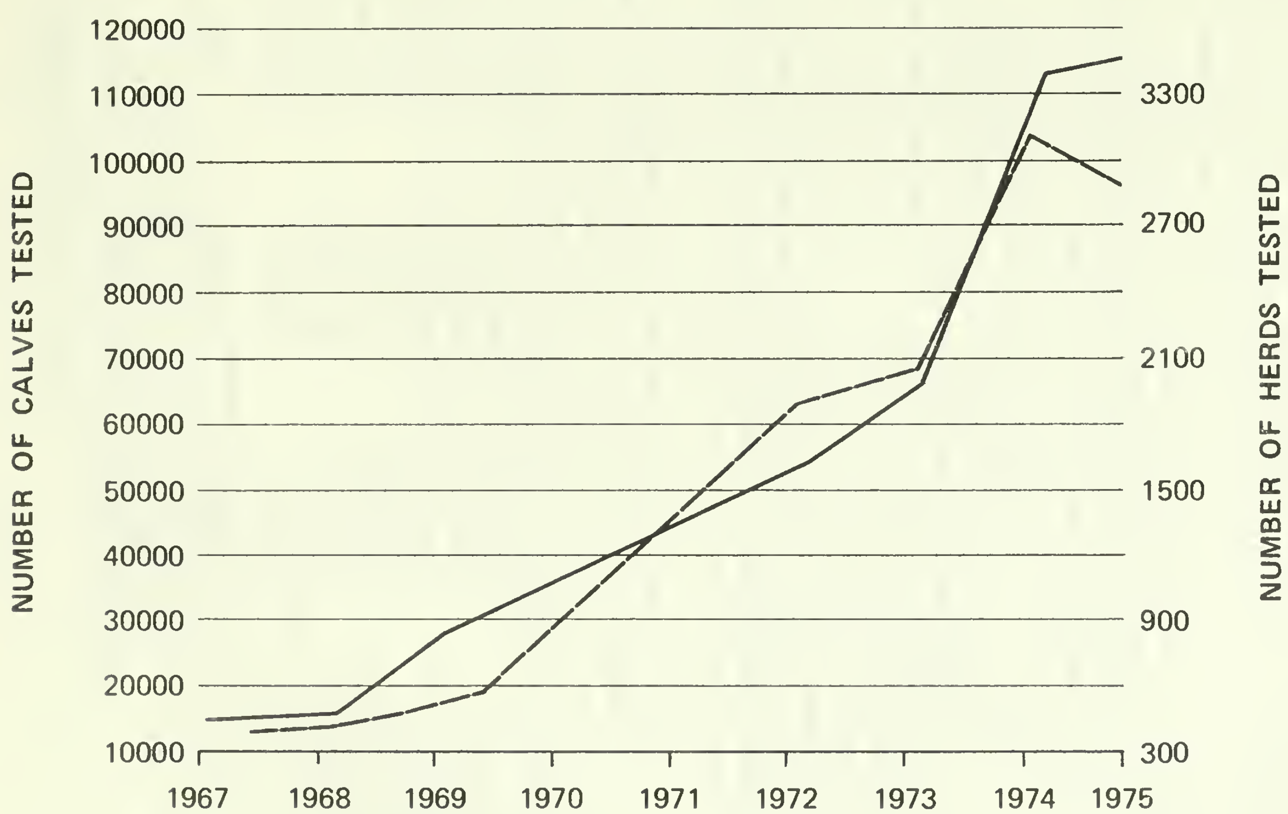
Hereford and Angus are the traditional breeds of beef cattle which have formed the backbone of the cow population because of their hardiness, climatic adaptation and excellent foraging ability. Since 1964, there has been a major importation of continental European breeds such as the Charolais, Simmental, Maine-Anjou and Limousin of which the Charolais and Simmental have become well established. The infusion of these breeds, to broaden the genetic base, will help to improve such economically-important traits as reproductive performance, rate of gain, feed conversion and meat quality.

Crossbreeding in the commercial sector has increased in recent years to take advantage of the complementarity of certain breeds and of hybrid vigor. There is little question that this importation of breeds has improved the productive efficiency of the beef industry at large.

The number of herds enrolled and calves weighed on the official federal-provincial performance testing program has increased substantially during the past five years as illustrated in Figure 11.1. Within-breed genetic improvement of productive traits has been insignificant until quite recently. However, seedstock breeders and commercial producers are now more performance-conscious. This creates more interest in performance-testing programs; it should mean that more rapid genetic improvement in the future can be anticipated.

The use of artificial insemination (AI) for beef cattle has become more widespread in recent years, with approximately 10 percent of the national calf crop being AI sired. The major constraints preventing an expansion of AI usage are estrus detection and estrus synchronization in the female. Wider use of AI would provide an important means of genetic improvement.

FIGURE 11.1 GROWTH IN THE ROP PROGRAM, CANADA, 1967 to 1975



11.2.3 The Cow-Calf Enterprise

Output

Although a significant proportion of producers are involved in both the cow-calf and the growing-finishing sectors, many specialize in one or the other. There are 159,000 (1971 Census) cow-calf operations in Canada and they are typically small, with only 3.7 percent of herds exceeding 100 cows. Most beef herds are in Western Canada (Tables 11.2 and 11.3), but about 25 percent of beef and veal comes from dairy herds, concentrated chiefly in Ontario and Quebec.

Table 11.2 STRUCTURE OF THE PRIMARY BEEF INDUSTRY, CANADA, 1975

	1 to 17 Cows	18 to 62 Cows	63 to 177 Cows	178 & over Cows	Total Farms
		- number of farms -			
Maritimes	5,539	603	29	3	6,174
Quêbec	20,501	1,833	56	7	22,397
Ontario	24,217	7,835	394	28	32,474
Manitoba	9,258	6,785	396	56	16,995
Ssakatchewan	19,178	17,442	2,666	261	39,487
Alberta	15,432	15,622	4,275	670	35,999
B.C.	3,701	1,174	517	161	5,553
CANADA	97,826	51,294	8,733	1,186	159,079
(% of Total)	61.5	32.2	5.5	0.8	100

Source: Census of Agriculture Division, Statistics Canada.

Table 11.3 REGIONAL DISTRIBUTION OF THE BEEF COW POPULATION, CANADA, 1975

Province	Number	Percent
	000 head	%
Maritimes	60.5	1.4
Quebec	235.0	5.3
Ontario	555.0	12.7
Eastern Canada	850.5	19.4
Manitoba	455.0	10.4
Saskatchewan	1220.0	27.9
Alberta	1620.0	37.0
British Columbia	230.0	5.3
Western Canada	3525.0	80.6
CANADA	4375.5	100.0

Source: Census of Agriculture Division, Statistics Canada.

The output of the cow-calf sector is weaned calves of 180-230 kilograms liveweight which may be sold as feeders or maintained on a forage program, to go into the feedlot at a later date. One measure of the potential output from this sector is the number of calves born (account must be taken of the requirements for herd replacement). The available data on calves born include both beef and dairy breed calves, both of which have potential for beef production. Table 11.4 shows clearly the long-term growth in the cattle herd in Western Canada and the relatively stable pattern in Eastern Canada, a reflection of the gradual decline in dairy cow numbers, with the losses being replaced by some additions to the eastern beef herds. The average percentage of calves weaned from a herd is approximately 85 percent.

Table 11.4 NUMBER OF CALVES BORN TO ALL COWS BY REGION, CANADA, SELECTED YEARS, 1951 TO 1976

Year	Calves Born			Number of	
	West	East	Canada	Beef Cows	Dairy Cows
		- 000 head -			
1951	1,542.5	2,084.6	3,627.1	n.a.	3,513.0
1961	2,516.7	2,223.6	4,740.3	2,268.1	3,200.0
1971	3,168.0	2,233.0	5,451.0	3,436.5	2,157.5
1972	3,202.0	2,165.9	5,367.9	3,679.4	2,210.8
1973	3,409.0	2,286.2	5,695.2	3,940.6	2,152.0
1974	3,587.0	2,133.5	5,720.5	4,295.5	2,082.1
1975	3,639.0	2,165.3	5,804.3	4,375.5	2,135.5
1976	3,415.0	2,037.5	5,452.5	4,043.5	2,048.0

Source: Statistics Canada, Cat. 23-004.

The bulk of feeder cattle are produced in Western Canada. In recent years, 300,000 head to 500,000 head have been shipped east annually where they are fed out and marketed. The growth in cattle feeding in Eastern Canada is based on a good supply of corn due to a steady growth in corn production combined with a readily available supply of feeders from Alberta and Saskatchewan. Ontario is self-sufficient in feed grains and only small numbers of cattle are fed in Quebec and the Maritimes which depend to a large extent on feed grains from Western Canada. Heavier cattle or 'shortkeep' cattle are marketed in larger numbers in Western Canada. The extent of these marketings is closely related to the price of grain. The lower grain prices are, the younger the cattle when put on feed. During high grain prices, cattle are left on the range longer in order to maximize the use of forage for cheaper growth.

Production Costs

The cow-calf industry depends on the availability of inexpensive grazing land and low-cost feed. Feed is the major cost item, accounting for approximately 70 percent of total production costs. This will vary somewhat, depending on grain and roughage costs from year to year.

A summary of information collected on production costs of cow-calf enterprises indicates that the average total feed cost per cow unit for the period 1970-75 was $67.04 per year. Feed costs are approximately 20 percent higher in Eastern Canada than in Western Canada.

Primary Marketing

Four main marketing channels for calves exist. They are public stockyards, private sales, shipment direct for export (mainly to the United States) and local or community auctions. The latter have grown rapidly in popularity since the 1950's because of their proximity to the supply of cattle. The data

Table 11.5 CALF MARKETINGS AT PUBLIC STOCKYARDS AND SHIPPED DIRECT TO PACKING PLANTS, CANADA, SELECTED YEARS, 1951 TO 1975

Year	Veal Good & Choice	Butcher	Comm. & Medium	Grass Calves	Stocker Calves	Total Market-ings	Movement to: Public Stock-Yards	Direct to Plant	Export	Country Points Outside of Province	Total
						-number-					
1951	189,607	-	370,812	54,604	63,985	679,008	346,447	332,561	10,477	7,820	697,305
1961	173,071	-	423,613	51,196	271,110	918,990	526,386	302,604	40,991	89,998	1,049,979
1971	123,464	13,939	353,566	-	356,433	847,402	531,039	316,363	110,944	207,471	1,165,817
1972	111,702	12,925	294,414	-	401,112	820,153	553,609	266,544	126,430	219,159	1,165,742
1973	93,428	19,970	205,166	-	426,007	744,571		744,571[a]	154,863	198,394	1,097,82
1974	107,814	37,268	296,914	-	291,212	733,288		733,288[a]	515,551	345,678	1,130,519
1975	126,097	63,193	509,159	-	295,868	994,317		994,317[a]	19,401	202,911	1,215,716

[a]Separate data no longer available.
Source: Agriculture Canada, Livestock Market Review, (various issues).

in Table 11.5 account for a significant portion of the calves sold for slaughter but only for a relatively minor part of the grass and stocker calves sold for further feeding. Indeed, accurate accounting of feeder calves marketed is difficult since the 250 (1974) country auctions account for most of these sales and data are not collected from these auctions on a regular basis. The inward (within Canada) movement of cattle and calves is the closest approximation available to show the pattern over time (Table 11.6). These data include movements through public stockyards and some country auctions and represent all those recorded sales which move between census districts, countries or provinces.

Price determination is of course heavily dependent on supply and demand. The value of feeder calves is influenced additionally by their weight, breed composition, sex, horn condition, and conformation.

Table 11.6 INWARD MOVEMENT OF CATTLE AND CALVES MARKETED THROUGH PUBLIC STOCKYARDS AND SOME COUNTRY AUCTIONS, AND RETURNED TO COUNTRY POINTS, BY REGION, CANADA, SELECTED YEARS, 1951 TO 1975

	Cattle			Calves		
Year	Canada	East	West	Canada	East	West
			-number-			
1951	244,209	117,165	127,044	57,021	28,457	28,564
1961	396,837	157,404	239,433	236,602	162,986	73,616
1971	490,388	117,455	372,933	550,281	302,293	247,988
1972	508,495	130,794	377,701	585,987	333,802	252,185
1973	478,584	114,020	364,564	576,707	337,880	238,827
1974	437,336	163,001	274,335	511,775	365,824	145,951
1975	529,418	191,181	338,237	453,075	295,926	157,749

Source: Agriculture Canada, Livestock Market Review, (various issues).

11.2.4 The Finishing Enterprise

Output

In the early 1960's, about half of the nation's cattle slaughter originated from feedlots, while through the early 1970's this figure had increased to over two-thirds, the remainder being fed out on the farm. The production of grain-fed cattle has not always kept pace with the growing domestic demand for fed beef, as there have been periodic imports of United States grain-finished cattle for immediate slaughter in recent years. However, the abnormally high levels of imports of United of the United States government policy on beef price controls at the time (Table 11.7).

Increased cattle feeding in Canada has been a major factor in the growth of the beef industry since the 1950's. It has resulted in a strong domestic demand for feeder cattle, as well as for feed grain, and has thus generated considerable additional revenue to the economy.

Table 11.7 FED CATTLE SLAUGHTER AS A PERCENT OF TOTAL SLAUGHTER[a], CANADA, SELECTED YEARS, 1962 TO 1975

	Total Inspected Slaughter (Gradings)	Fed Cattle Slaughter	% Fed Cattle of Total Gradings	Live Imports of U.S. Slaughter Cattle
	- 000 head -		%	number
1962	2,026.8	1,036.8	51	1,339
1971	2,731.4	1,813.1	66	55,548
1972	2,814.6	1,945.2	69	64,003
1973	2,719.0	1,813.6	68	208,539
1974	2,935.5	1,945.4	66	109,207
1975	3,392.3	2,163.2	64	41,895

[a]Excludes imports of United States slaughter cattle.
Source: Health of Animals Branch, Agriculture Canada

Production Costs

More than 90 percent of the total cost in fattening cattle results from the purchase of cattle and feed (Table 11.8). In recent years, feed has assumed a larger proportion of total costs.

In the Prairie Provinces, the feeder cattle ration is essentially based on local barley. More recently, there has been some increase in the feeding of corn silage. Feedlots in Western Canada have the distinct advantage of being close to an ample supply of feeder cattle. The regional distribution of farms feeding cattle is summarized in Table 11.9. Cattle feeding in Eastern Canada is mainly located in Ontario; corn silage is the basic ingredient in the feeding ration. About two-thirds of the feeder cattle that go into Ontario feedlots originate in Western Canada. Investments in Ontario feedlot enterprises are generally higher than in Western Canada.

Table 11.8 ANNUAL AVERAGE COSTS FOR FEEDLOT ENTERPRISE, CANADA, 1970 to 1975

Year	Feed Cost	Feeder Cost	Interest Cost	Other Cost	Total Cost
			$/cwt. produced -		
1970-71	5.05	18.72	0.97	1.07	25.82
1971-72	5.20	19.25	0.85	1.13	26.43
1972-73	6.25	21.76	0.88	1.27	30.16
1973-74	12.61	26.55	1.36	1.67	43.52
1974-75	16.86	23.75	1.67	1.89	44.18
1975-76	15.33	19.93	1.23	2.02	38.51

Source: Economics Branch, Agriculture Canada.

Table 11.9 REGIONAL DISTRIBUTION OF FARMS REPORTING CATTLE 'ON FEED', CANADA, 1971

	Number of Farms						
Number of Head	Maritimes	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1 - 32	4440	8836	19340	6579	14139	9868	2383
33 - 77	92	128	2794	809	1971	3234	133
78 - 122	13	16	972	180	415	993	41
123 - 177	8	6	442	69	151	471	17
178 - 272	5	6	347	54	109	309	21
273 - 527	2	3	209	30	54	251	13
528 & over	1	1	62	17	23	113	9
TOTAL	4561	8996	24166	7738	16862	15238	2617

Source: Census of Agriculture Division, Statistics Canada.

Primary Marketing

Total marketings, excluding feeder cattle, rose from 1.16 million in 1951 to 3.4 million in 1975 (Table 11.10). In recent years, about three-quarters of the total cattle marketed have been steers and heifers. In 1975, 88 percent of these graded A.

Table 11.10 CATTLE MARKETINGS AT PUBLIC STOCKYARDS AND SHIPPED DIRECTLY TO PACKING PLANTS AND INVENTORY OF CATTLE AND CALVES JUNE 1, CANADA, SELECTED YEARS, 1951 TO 1975

	Numbers Marketed for Slaughter					Inventory of Cattle and Calves
Year	Steers	Heifers	Cows	Bulls	Total	June 1, (000)
1951	391,754	226,892	444,858	93,360	1,156,864	8,363.1
1961	1,001,908	385,009	566,045	74,045	2,027,007	11,933.8
1971	1,446,102	604,100	627,697	66,300	2,744,199	13,170.6
1972	1,535,747	612,758	601,378	67,889	2,817,772	13,656.5
1973	1,476,986	538,843	622,020	66,015	2,703,864	14,133.5
1974	1,546,849	654,835	616,521	65,368	2,901,573	14,948.0
1975	1,583,887	884,380	866,243	74,006	3,418,516	15,263.0

Sources: (1) Agriculture Canada, Livestock Market Review, (various issues).
(2) Statistics Canada, Cat. 23-004.

For beef producers selling fattened cattle, three main marketing channels are used. About 55 percent of slaughter cattle sales were direct to packers, 30 percent were sold through the nine public stockyards, and 15 percent through country auctions in 1974.

Sales direct to packers may be made either on a liveweight or rail grade basis using sealed bids from a number of packers, or by private treaty. For each of these methods, the producer pays the marketing costs which differ for each channel.

The Commission of Inquiry into the marketing of beef and veal reported a dramatic growth of direct-selling to packer over the period 1951-75. Another avenue for marketing which is important in the determination of prices, but not so significant in terms of numbers, is direct sale for export.

The market price for finished cattle results from the interaction between demand by the meat packing industry, and the available supply of slaughter cattle. The market price is established in Toronto and Montreal and this influences pricing at other major centres such as Winnipeg and Calgary. The price difference between east and west is primarily the cost of transportation, although it will vary somewhat in relation to local supply and demand.

In the determination of slaughter cattle prices, packers reflect in their bids the price which retailers (and eventually consumers) are willing to pay for the available supply. To do this, they generally consider that the returns from the sale of by-products such as hides and offal cover the cost of slaughter and processing so that the live value and the carcass value (on a carcass equivalent basis) should follow each other closely.

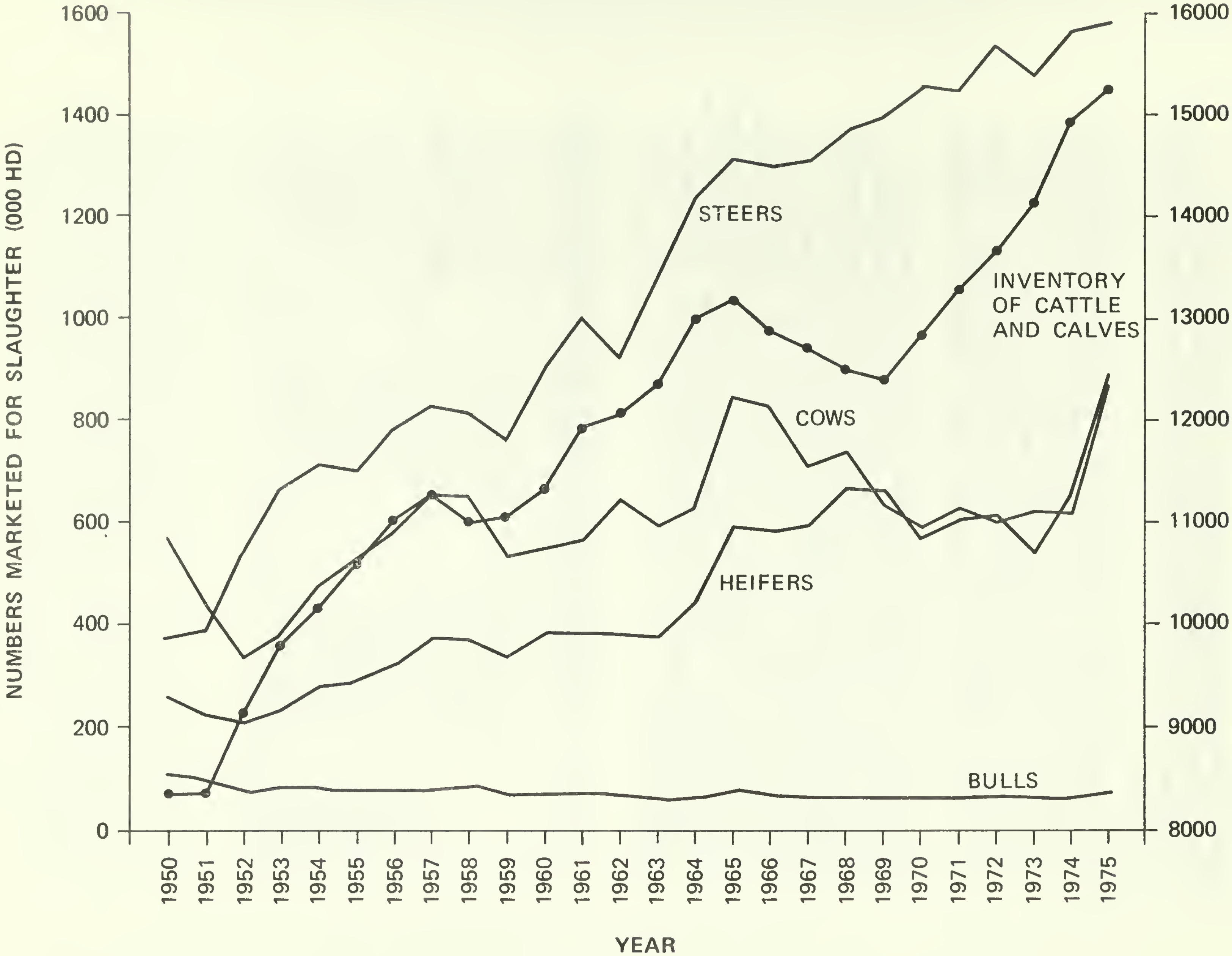
The Cattle Cycle

The cattle cycle is an important phenomenon of the beef system. When the price of cattle is high relative to other production possibilities, the tendency is to hold back cows and heifers for breeding. Inventories are thus augmented, marketings reduced and prices strengthened. As inventory numbers build up and the progeny of the increased cow numbers reach market weight, marketings increase. Eventually, increased marketings reduce prices to a point that discourages further expansion and eventually some liquidation of inventories takes place. The following decline in marketings results in prices increasing and the beginning of a new cycle.

The impact of the cattle cycle is different at any time for different classes of animals. With the cycle being common to the whole of North America, there are considerable effects on the different types of beef available at different stages of the cycle and therefore their price. Figure 11.2 illustrates the cattle cycles from 1950 to 1975.

As a result of depressed beef prices during the last two years, herd liquidation occurred in 1975 and slaughter cow and heifer marketings peaked. Consequently, the cattle inventories on farms on July 1, 1976 were down 4 percent from the same date in 1975.

FIGURE 11.2 **NUMBER OF CATTLE & CALVES ON FARMS, CANADA, 1950 to 1975**



Source: (1) Agriculture Canada, Livestock Market Review (various issues)

(2) Statistics Canada, Cat. 23–004 (semi–annual)

11.3 THE SECONDARY SECTOR

11.3.1 Slaughter and Processing

The livestock/red meat industry in 1971 (census) made a contribution of approximately $10 billion to economic activity, at a time when the gross national product of Canada was $92 billion.

The secondary sector (slaughtering and processing) of the livestock/red meat industry, is Canada's largest food industry and adds value to the raw product (Tables 11.11 and 11.12). The packing industry ranks third among major manufacturing industries, being surpassed only by the motor vehicle and pulp and paper industries. The industry pays approximately $300 million annually in salaries and wages to about 32,000 people.

Since 1950, the weekly slaughter of cattle in Canada has increased from 24,700 head to 62,300 head in 1975 (Table 11.13). This trend is continuing in 1978 with weekly average slaughter continuing at levels in excess of 71,000 head per week. At the same time, quality improvement has been continuous throughout the 26-year period. In 1950, the A, B and C grade constituted 41.2 percent of total slaughter while in 1975 the equivalent grade slaughter made up 75.2 percent of total slaughter. Quality improvement continued in 1976 with A, B and C grade quality constituting 77.2 percent of slaughter (Table 11.14).

Table 11.11 VALUE ADDED IN THE SECONDARY BEEF SECTOR, CANADA, SELECTED YEARS, 1951 TO 1973

Year	Value of Shipments of Goods of Own Manufacture	Value Added in Manufacturing Activity	Total Value Total Activity
		- $000 -	
1951	892,090	120,488	-
1961	1,124,785	202,490	210,809
1971	2,121,358	403,711	420,051
1972	2,551,415	428,649	445,364
1973	3,288,521	530,028	555,154

Source: Statistics Canada, Cat. 32-221-P.

Table 11.12 STRUCTURE OF THE SECONDARY BEEF INDUSTRY, CANADA, 1975

	B.C.	Alta.	Sask.	Man.	Ont.	Que.	Mar.	Canada
				-number of plants-				
Slaughter	2	8	15	8	7	-	4	44
Slaughter & Processing	2	9	4	5	17	5	8	50
Process	19	17	2	7	80	78	4	207
TOTAL	23	34	21	20	104	83	16	301

Source: Health of Animals Branch, Agriculture Canada.

All beef products destined for interprovincial or international transit must be federally inspected at place of slaughter and point of origin. Meat inspection is carried out by trained, government lay and veterinary inspectors. Meat destined for intra-provincial transit may be inspected under the authority of the provincial governments.

Plant sanitation, animal health and adherence to processing regulations are enforced. Canada is one of the very few countries in the world that can export meat into any major market. This is because of a highly-creditable federal meat inspection service.

The evaluation of meat quality is routinely done through a grading system administered by the federal government. All cattle slaughtered in federally inspected abattoirs are graded, each beef carcass being assigned a classification or categorization.

The grading system is a dual system of evaluating and classifying carcasses based on anticipated palatability and yield. Each grade has a letter such as A, which depicts palatability and a number which depicts yield. For example, an A-1 carcass is one of high anticipated palatability and high yielding. The grades range from A to E and from 1 to 4 for grades A, B and D and 1 to 2 for grade C. This classification system for grading beef carcasses was introduced on September 5, 1972.

The disposition or yield of a typical beef steer is shown in Figure 11.3. Approximately 43 percent of the animal is comprised of non-carcass components. Considering the fat trim and the bones removed in 'breaking' the carcass and the 43 percent previously mentioned, approximately 57 percent of the animal can be classified as by-product. The most valuable single by-product is the hide (Table 11.15).

Table 11.13 TOTAL INSPECTED SLAUGHTER BY PROVINCE, CANADA, SELECTED YEARS, 1951 TO 1975

Year	B.C.	Alberta	Sask.	Manitoba	Ontario	Quebec	Mar.	Canada
				-number-				
1951	86,630	164,293	72,015	218,464	399,675	208,172	-	1,149,789
1961	90,734	534,173	119,410	389,283	664,916	207,792	35,165	2,041,473
1971	39,364	1,015,967	155,722	425,296	915,126	198,528	39,905	2,786,908
1972	32,651	1,112,338	171,007	435,705	925,406	163,124	38,360	2,878,591
1973	33,641	1,112,301	161,672	435,046	930,757	166,491	38,108	2,878,016
1974	34,247	1,131,523	171,079	455,489	980,151	165,715	37,629	2,975,833
1975	34,990	1,352,116	168,359	507,750	1,018,118	205,224	51,130	3,337,687

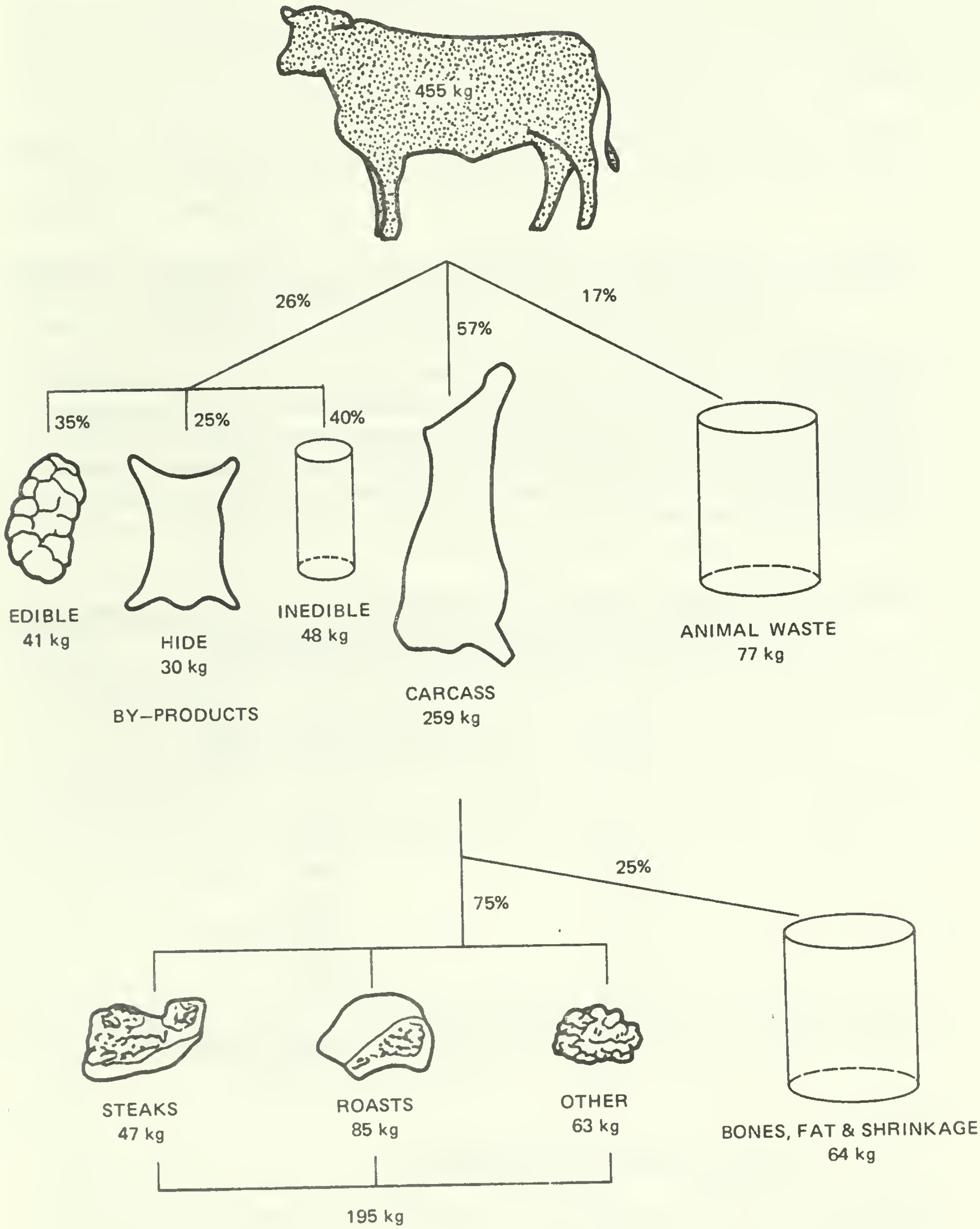
Source: Agriculture Canada, Livestock Market Review (various issues).

Table 11.14 BEEF CARCASS GRADE DISTRIBUTION PERCENTAGE, CANADA, 1972 TO 1976

Year	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	D1	D2	D3	D4	E	Total
1972	23.1	29.0	12.4	4.5	3.1	0.4	.1	.1	3.3	0.7	3.4	3.9	2.9	11.3	1.8	100.0
1973	27.5	28.8	9.7	3.0	3.7	0.2	0.0	0.0	3.6	0.7	3.7	3.9	3.4	9.8	1.9	100.0
1974	32.0	26.1	7.3	2.0	5.0	0.2	-	-	4.5	1.0	3.4	3.7	3.4	9.0	1.8	100.0
1975	33.5	24.2	5.4	1.1	4.4	0.2	-	-	5.2	1.2	4.1	4.2	3.8	10.9	1.8	100.0
1976	36.3	25.2	5.4	1.2	3.4	0.1	-	-	4.6	1.0	4.1	3.6	3.2	10.5	1.4	100.0

Source: Agriculture Canada, Livestock Market Review, (various issues).

FIGURE 11.3
APPROXIMATE DISPOSITION OF A FED BEEF STEER, CANADA, 1975



Source: Food Prices Review Board.

Table 11.15 PRODUCTION OF HIDES FROM CATTLE AND CALVES, CANADA, SELECTED YEARS, 1951 TO 1973

	Hides			
	Cattle		Calf	
Year	No.	Value	No.	Value
		- $000 -		
1951	1,112,591	19,260	465,846	3,437
1961	1,913,656	15,311	588,237	3,597
1971	2,793,154	20,120	451,630	1,496
1972	3,071,642	48,922	425,061	2,521
1973	2,967,589	51,367	252,210	2,086

Source: Agriculture Canada, Livestock Market Review, (various issues).

A significant factor to note is the upward trend in carcass weights (Table 11.16). This is attributable to the increased proportion of cattle fed through centralized feedlots, to the increased use of crossbreeding with European breeds in feeder calf production and to a grading system that does not prejudice against heavier carcasses.

Table 11.16 AVERAGE WARM CARCASS WEIGHT OF CATTLE SLAUGHTERED, CANADA, SELECTED YEARS, 1951 to 1975

Year	Average Weight (kg)
1951	229.1
1961	241.0
1971	258.7
1972	260.1
1973	260.3
1974	256.0
1975	250.1

Source: Agriculture Canada, Livestock Market Review, (various issues).

11.3.2 Marketing and Merchandising

Beef production and slaughter facilities are often located far from centres of consumption, e.g., 63 percent of our beef is slaughtered in Western Canada while only 30 percent is consumed there. In addition, live animals both slaughter and feeder weights, are shipped from west to east.

Beef is shipped to the retail store in the form of carcass, quarters, primal and sub-primal cuts. Currently, about 50 percent of the beef going to retail outlets is still in carcass form, which requires skilled butchers to reduce the carcass to consumer cuts. A rapidly-developing change is to centralized cutting, whereby the carcass is broken down either at the packing plant, by an intermediate wholesaler or at a retail chain warehousing facility. The advantages of this latter procedure are that less skilled labor is required, a better utilization of by-products is made and transportation costs are reduced. The saving is more pronounced if the operation is carried out at the packing house level. The trend towards centralized cutting can be expected to grow rather rapidly in the next five to ten years.

An important link in the beef distribution chain is the purveyor who caters to the needs of the food service industry, where 30 percent of our beef is consumed. This group of suppliers developed specifically to serve the food service industry and has grown at a very rapid rate. When one includes all the independent operators (either federally-inspected or non-inspected) and the branches of major firms, the establishments involved number in the hundreds. Purveyors buy primal and sub-primal cuts, frequently for further manufacture into portion cuts. In addition, they are, of course, large buyers of boneless beef for hamburg pattie operations.

The broker is another important link in the Canadian meat system. His principal role is bringing buyer and seller together; for this he receives a fee in the 1/2 - 1 cent per kilogram range. Another type of broker is the one who provides the marketing service for a slaughtering or processing facility. Some brokers speculate by buying and holding inventories of frozen meat, but their normal role is to link the supplies of one company to the needs of another. There are probably about 100 meat brokerage firms of various sizes located across Canada.

11.3.3 Consumption

The per-capita consumption of beef has grown from 23.1 kilograms in 1950 to 46.5 kilograms in 1975. For veal, disappearance has declined from 4.3 kilograms per capita in 1950 to 2.5 kilograms per capita in 1975.

The dramatic increase in the per-capita consumption of beef in Canada (and in the United States and a number of other countries) is due to a number of factors. Changes in tastes, lifestyles and other sociological variables have had an effect, but the dominant influence has been that of rapidly-rising incomes. A measure of the effect of income on the demand for and price of beef is income elasticity, one estimate of which is provided in Table 11.17. With a one-percent increase in per-capita disposable income, per-capita consumption of beef can be expected to increase on average by 0.51 percent.

Price effects are also involved in influencing the demand for beef. A one-percent increase in the price of beef on average results in a 0.85 percent decline in the per-capita consumption of beef. In addition, there is the effect of prices of other products; for example, a one-percent increase in the price of pork will increase the consumption of beef by 0.11 percent.

For veal, the income elasticity is similar to that for beef (0.52) but its price elasticity is much larger, at 2.59. With substantial increases in the price of veal, the decline in consumption has exceeded the gains in consumption resulting from increases in income.

Table 11.17 ELASTICITY ESTIMATES FOR BEEF AND VEAL, CANADA, 1975

	Beef	Pork	Lamb	Veal	Income
Beef	-0.85	0.06	0.01	0.01	0.51
Pork	0.11	-0.95	0.02	0.03	0.13
Lamb	0.41	0.47	-1.87	0.01	0.68
Veal	0.27	0.54	0.01	-2.59	0.52

Source: Hassan, Z.A. and S.R. Johnson, Consumer Demand for Major Foods in Canada. Agriculture Canada, Ottawa, 1976.

The pattern of consumption of beef and veal is obviously a function of population distribution. In 1975, 63 percent of Canada's population resided in Quebec and Ontario. With Ontario nearly self-sufficient in beef production, Quebec is the major deficit area, importing much of its beef from Alberta. The beef shipped from Western Canada to Quebec (mainly Montreal) is of high quality.

Growth and development of the hotel, restaurant and institutional (HR&I) trade has also contributed significantly to the increase in beef consumption. Approximately one out of every three meals eaten is served by the HR&I trade, with beef providing the leading meat entry. Aligned with this, has been the development of fast-food or convenience beef items which have facilitated the increase in beef consumption. This is a growing market for beef which is likely to have a major impact on beef marketing because of the demand for hamburger.

11.3.4 International Trade

The import-export balance of beef and veal has changed dramatically since 1951 (Table 11.18). Specifically, in 1951, Canada exported about 38 million kilograms more than it imported. In 1975, 48 million kilograms more were imported than exported. It appears that this trend will likely continue. It should be noted that this negative trade balance is partially offset by the exportation of some feeders and slaughter cattle (Table 11.19).

Canada is a consistent net importer of canned beef (primarily canned corn beef). No exports of this category from Canada are reported by Statistics Canada. Imports of canned corn beef are mainly from South American countries and, in recent years, Australia (Table 11.20).

The trade balance between Canada and the United States is affected by a number of factors, major among which is the available supply in either country. The Canadian price is a function of the United States market, the Toronto price essentially fluctuating between Omaha price, plus or minus freight. Whichever this is determines whether Canada is on an import or export basis with respect to the United States.

An increasingly important factor affecting the import-export balance in the beef and veal trade has been the importation of manufacturing beef from Oceania. With the increasing demand for hamburger meat and, up to now, relatively free access to the Canadian market, the future situation will depend upon world beef demand, import policy and the competitive position of the Canadian beef industry.

With respect to the United States, given similar trade relations, continued emphasis on competitiveness would seem essential. This will permit exports of feeder cattle and cull cows when they are in surplus as a means of relieving pressures on the domestic market.

A small but significant volume of beef cuts is imported from the United States on a continuing basis, primarily to service the HR&I trade. Factors influencing this importation are, primarily, uniformity and volume available and price. Reciprocal export from Canada is virtually prevented by a 10 percent ad valorem United States tariff against the 6.6 cents per kilogram Canadian tariff.

Table 11.18 EXPORTS AND IMPORTS OF BEEF AND VEAL, CANADA, SELECTED YEARS, 1951 TO 1975

Year	Imports of Fresh, Frozen & Pickled Beef & Veal	Exports of Beef & Veal
	-kg-	
1951	4,752,185	42,476,045
1961	13,134,654	14,199,863
1971	52,561,909	39,533,909
1972	72,387,663	31,075,662
1973	72,054,413	29,031,591
1974	63,078,886	18,478,739
1975	65,559,159	15,438,050

Source: Agriculture Canada, Livestock Market Review, (various issues).

Table 11.19 EXPORTS AND IMPORTS OF LIVE CATTLE AND CALVES, CANADA, SELECTED YEARS, 1951 TO 1975

	Imports		Exports	
Year	Cattle	Calves	Cattle	Calves
1951	-	-	227,729	11,384
1961	-	-	474,319	28,820
1971	84,327	-	119,931	125,290
1972	64,003	38	62,851	107,703
1973	208,539	590	144,313	63,991
1974	109,207	30	18,276	5,564
1975	41,895	50,669	140,825	3,202

Source: Agriculture Canada, Livestock Market Review, (various issues).

Table 11.20 TRADE IN CURED BEEF AND IMPORTS OF CANNED BEEF AND VEAL, CANADA, SELECTED YEARS, 1950 TO 1975

	Trade in Cured Beef				Imports of Canned Beef & Veal	
	Exports		Imports			
	tonnes	$000	tonnes	$000	tonnes	$000
1950-54	227	106	4,600	2,277	5,593	3,778
1960-64	864	442	5,600	3,908	4,844	4,140
1970	2,273	1,388	4,400	4,434	6,051	5,980
1971	2,000	1,130	5,600	5,734	4,397	5,670
1972	3,227	2,264	5,100	6,415	6,051	8,106
1973	2,500	2,704	3,600	5,656	4,651	7,141
1974	1,591	1,633	1,000	1,558	4,218	9,555
1975	2,727	2,389	45	9	4,665	8,355

Source: Statistics Canada, Cat. 65-202 and 65-203.

Table 11.21 EXPORTS AND IMPORTS OF TALLOW, CANADA, SELECTED YEARS, 1950 TO 1975

	Exports			Imports			Canada's Balance
	U.S.A.	All Countries		U.S.A.	All Countries		All Countries
	$000	tonnes	$000	$000	tonnes	$000	$000
1950-54	110	7.0	1,040	417	1.9	417	623
1960-64	70	48.5	7,397	458	2.3	467	6,930
1970	1,056	81.5	15,307	2,073	9.9	2,073	13,234
1971	1,658	99.5	18,733	1,880	9.6	1,880	16,853
1972	1,306	104.4	15,855	1,491	8.4	1,491	14,364
1973	3,751	82.1	22,765	1,009	2.8	1,009	21,750
1974	3,368	99.0	40,309	1,480	3.5	1,480	38,829
1975	2,587	98.1	31,263	520	1.7	528	30,735

Source: Statistics Canada, Cat. 65-202 and 65-203.

Canada has traditionally enjoyed a favourable market and trade balance in tallow (Table 11.21) and raw cattle hides (Table 11.22), as well as in purebred cattle and semen (Table 11.23). The major influx of continental European breeds in 1973 and 1974 resulted in a negative trade balance in live cattle. However, this was at least partially offset by a highly significant increase in the exportation of semen; primarily to the United States. It is anticipated that Canada will quickly return to a small positive trade balance in live cattle, and a significant reduction in semen exportation.

Table 11.22 EXPORTS AND IMPORTS OF RAW CATTLE HIDES, CANADA, SELECTED YEARS, 1950 TO 1975

	Exports			Imports			Canada's Balance
	U.S.A.	All Countries		U.S.A.	All Countries		All Countries
	$000	000	$000	$000	000	$000	$000
1950-54	2,763	477.3	5,115	3,910	446.1	4,610	505
1960-64	1,665	1,186.5	9,584	5,105	725.6	5,191	4,393
1970	2,919	1,910.1	16,113	8,425	1,089.9	8,460	7,653
1971	1,861	1,864.5	14,053	9,116	1,125.4	9,120	4,933
1972	5,316	2,287.2	34,379	15,528	1,092.5	15,533	18,846
1973	12,682	2,238.9	48,375	17,707	995.0	17,718	30,657
1974	7,381	2,184.3	35,665	14,908	1,100.4	14,908	20,757
1975	12,186	3,192.5	39,331	12,872	1,238.6	12,872	26,459

Source: Statistics Canada, Cat. 65-202 and 65-203.

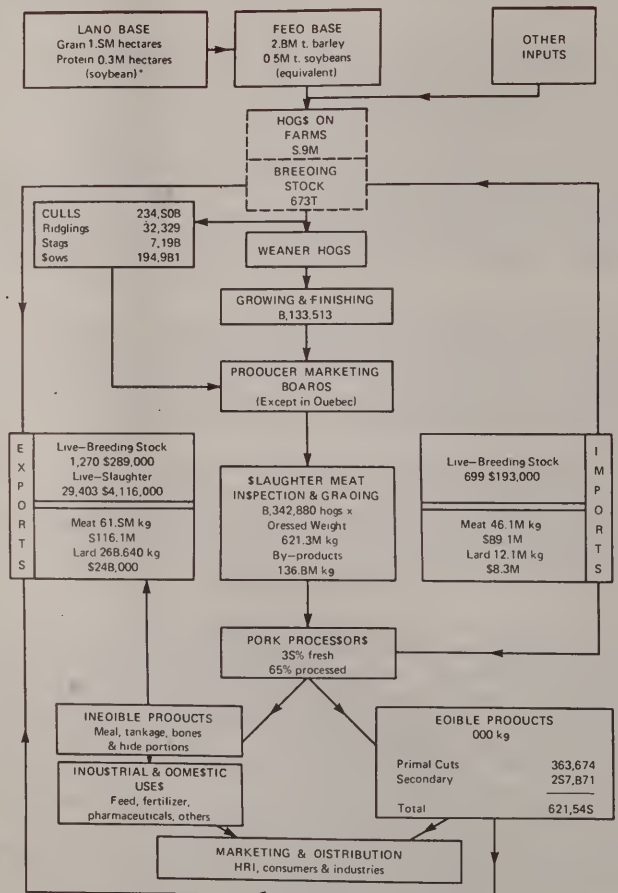
Table 11.23 PUREBRED BEEF CATTLE AND SEMEN TRADE, CANADA, SELECTED YEARS, 1961 TO 1975

Year	Importations		Exportations		Net	
	Live (head)	Semen (doses)	Live (head)	Semen (doses)	Live (head)	Semen (doses)
1961	2,826	n.a.	24,239	n.a.	21,413	n.a.
1971	4,893	75,149	6,708	1,011,743	1,815	936,594
1972	5,169	52,978	8,434	1,012,838	3,265	959,860
1973	10,933	42,945	10,217	1,070,240	- 716	1,027,295
1974	15,595	54,953	11,738	1,728,061	- 3,857	1,673,108
1975	5,162	146,335	5,910	847,861	748	701,506

Sources: (1) Statistics Canada, Cat. 65-202 and 65-203.
(2) AI Annual Report.

THE CANADIAN PORK SYSTEM

1975



* A LARGE PART OF THE SOYBEAN PROTEIN IS IMPORTED FROM THE U.S.A., SUCH THAT THE 0.3 MILLION HECTARES INCLUDE MUCH U.S.A AREA.

M Million
T Thousand
t tonnes

1. Pork is an important Canadian agricultural commodity and food product. Hogs provided over 100,000 producers with $886 million in cash receipts in 1975. Retail value is estimated at $1.6 billion.

2. Pork is a high quality, nutritious food particularly rich in protein and energy, but also contributing to minerals and vitamins. It has important supplemental and complementary value for other foods such as cereals, potatoes, etc. Domestic consumption averages about 58 lb/capita, second only to beef.

3. Production is based primarily on feed grains and oilseed protein. Pork production provides a market for the equivalent of 2.8 million tonnes of feed grain (barley equivalent) and protein from 0.5 million tonnes of soybeans. There are major opportunities to replace grain and oilseed protein with garbage for a substantial portion of Canadian pork production.

4. The 7–11 million hogs marketed annually are produced from coast to coast with centres of production in Ontario, Quebec and Alberta. In recent years, production has increased in Quebec and decreased in the Prairie Provinces. A large proportion are produced on small mixed farms providing for efficient marketing of home–grown grains and are an important factor in socio–economic stability. Unlike beef, pork production tends to be located closer to major centres of consumption.

5. Slaughter, processing and marketing of pork is an important segment of the food industry. Most pork is marketed in processed form, thus there is a large value added component in slaughter and processing; this is estimated at approximately $318 million and provides employment for about 12,000 workers.

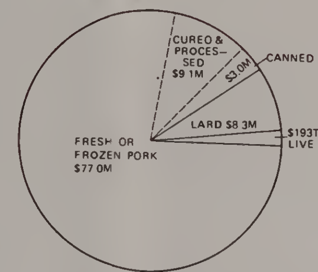
6. Pork production is primarily domestically oriented with a small export market. The high quality of Canadian pork, its ready access to the large U.S. markets, the recent rapid growth of the Japanese market and the large supplies of Canadian feed grains and oilseeds indicate excellent potential for growth of exports. Policies to ensure increased supplies, competitive prices and adequate support technology are essential for export growth.

7. Level of Canadian technology in production, processing and marketing compares favourable with many countries but lags behind Danish technology and the more advanced U.S. programs. Some improvement could be made through technology transfer; other aspects require an improved Canadian research program.

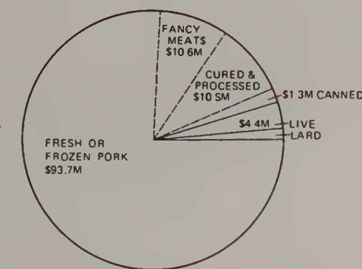
8. Marketing of Canadian hogs is through provincially controlled marketing boards, except in Quebec. Canadian pork prices are established primarily by the much larger U.S. market.

9. The future outlook for growth in pork production appears to be dependent on population increases (about 2 percent/year), exploitation of export markets, maintenance of a favourable hog/barley price ratio and developing alternatives to grain for feed (e.g. garbage).

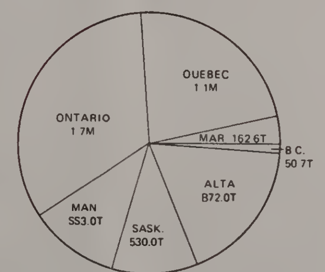
IMPORTS
$97.7M



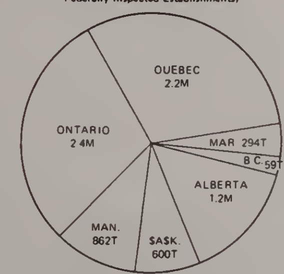
EXPORTS
120.6M



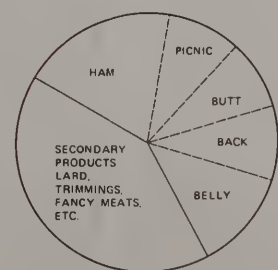
REGIONAL DISTRIBUTION
OF PRODUCTION 1976
4979.3T



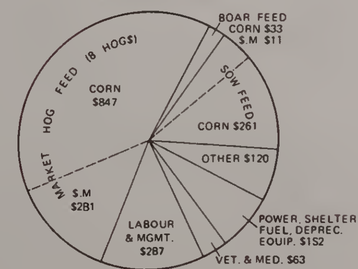
DISTRIBUTION OF SLAUGHTER
AND PROCESSING, 7.66M
(Based on Hog Slaughter in Federally Inspected Establishments)



PROPORTION OF PORK PRODUCTS



HOG INPUT COSTS – 1976
(One Sow Production Unit)



T Thousand
M Million
S M Soybean Meal

12. THE CANADIAN PORK SYSTEM

12.1 INTRODUCTION

The major product of hog production is fresh and processed pork. Canadian pork consumption for the 1970-75 period averaged about 26.4 kilograms per person, second only to beef among all meats. About two-thirds of pork consumption is in processed form. Pork is primarily a source of high quality protein and energy and also contributes vitamins and minerals. It supplements other foods such as potatoes, cereals and eggs, both nutritionally and gastronomically. By-products of pork production include lard, edible and inedible offal, hides and other products.

In 1975, hogs provided over 100,000 farmers with $886 million in cash receipts. The 7-11 million hogs marketed annually are produced from coast to coast, but primarily in Ontario, Quebec and the Prairie Provinces. A large proportion of Canadian pigs are produced in relatively small mixed farming operations providing an efficient market for home-produced grain and a source of income. This is an important socio-economic factor. The use of hogs to market western feed grains when grain stocks have been excessive has often led to instability in pork markets but at the same time has provided important cash income during such periods.

In aggregate, Canadian hogs provide a major market for feed grains and oilseed protein. The slaughtering, processing and marketing of pork contributes over $300 million in value added to the economy. The retail value of Canadian pork consumption in 1976 has been estimated at approximately $1.6 billion.

Until recently, pork exports have normally more than offset pork imports. The quality of Canadian pork, its access to the United States market and the recent rapid growth of the Japanese market indicate an excellent potential for growth in pork exports. The need is for stable supplies, competitive prices and some certainty of markets.

A major feature of the hog industry is the three to four year production and price cycle. This cycle is related to the lags between price and production changes. Canadian prices are established largely by the much larger United States market. Variability in production also is caused by fluctuations in the grain markets namely in the barley market for Western Canada and in the corn market for Eastern Canada. Grain is the major input cost and, in Western Canada, also represents the major alternative enterprise. The technology of hog production and processing is high in Canada although it may lag behind that of Denmark and advanced United States programs. Improved disease control, development of artificial insemination and improved reproductive rates would be major advances. There are possibilities for substituting garbage and other waste products for some of the grain and oilseed protein presently fed to hogs.

12.2 THE PRIMARY SECTOR

12.2.1 Resource Utilization

Feed grain is the major input used to produce hogs. The estimate for 1975 is that hogs consumed the equivalent of 2.8 million tonnes of barley from 1.2 million hectares of land, and protein equivalent to 0.5 million tonnes of soybeans from another 0.3 million hectares. (Corn is used in some areas of Ontario and feed wheat, etc., may be used.) It should be noted that a large proportion of the protein supplement required for Canadian hog production is presently imported from the United States as soybean; this situation results from problems in the quality and quantity of the rapeseed produced in Canada, and is in the process of being resolved.

Other resources include capital (land, buildings and equipment), labour, energy, etc. The investment in buildings and equipment and the annual cost of interest depreciation and repairs are roughly $462 million and $84 million, respectively. Assuming a high level of management, an equally rough estimate of labour requirements is 6.7 million hours at a cost of $20 million. Each hog production unit requires little land per se. However, land requirements for feed are additional and an appreciable area is used for manure disposal; the later use represents more of a valuable by-product, especially with current high fertilizer prices, than a cost of hog production. There is little regional variation in the amount of resources used per hog produced.

12.2.2 Hog Inventory and Breeds

In the fourth quarter of 1976, there were 5.7 million pigs on farms in Canada (Figure 12.1). About 11 percent (650,000) of these pigs were six months of age or over, indicating that they probably were animals kept for breeding (sows, boars and gilts). The proportion of sows to total pigs varies somewhat over time with the production cycle. Since few pigs or market hogs are shipped between provinces, the provincial distribution of pigs and breeding stock is essentially the same as the distribution of hog marketings (see highlights). There is however some interprovincial trade: Quebec buys market hogs (52,000 in 1975) and some 250,000 weaners annually from Ontario.

About 70 percent of the hogs marketed in Canada are of the Yorkshire breed. The Yorkshire, Landrace and Lacombe are white in colour, produce quality (lean, fine textured) pork and are well adapted to the confinement feeding used in Canada. Durocs and Hampshires and other coloured breeds also are found on Canadian farms as more recent additions to the country's swine production.

The genetic quality of the breeding herd is based on the efforts of some 700 private seed stock producers, six breeding companies and some imported stock. Artificial insemination in swine production is in a very early development stage. It is a promising technique, especially if a fully satisfactory method for freezing and distributing semen becomes available.

12.2.3 Hog Enterprises and Production Costs

Weaner pig producers specialize in selling weaned pigs (about 18 kilograms and 2 months of age) to producers specialized in feeding market hogs (about 95 kilograms pounds and 5-6 months old). A declining number of farrow-finish producers combine these two activities. The type of enterprise selected depends on the personal characteristics of producers, the kinds of resources available and the optimal organization for the overall farm business. The proportion of enterprises in each category is not known but farrow-finish enterprises are no doubt most common. Specialized feeders tend to be large in terms of number of hogs sold and less numerous than specialized weaner producers.

The major cost items in the weaner pig enterprise are feed (60 percent of total cost), building and equipment depreciation, repairs, taxes and insurance (15 percent), and interest (10 percent). These figures assume a high level of management. The number of pigs weaned per sow per year and control of feed costs are the most important efficiency factors. Top producers wean 18-20 pigs per sow per year compared to the average of about 14.

In the finishing enterprise, feed represents 55 percent of total costs and the feeder pig about 30 percent. These percentages fluctuate greatly over time as feed (grain and protein supplement) and feeder pig prices fluctuate. The feed conversion rate and efficiency of feed handling are important in controlling costs. The target feed conversion rate for the feeding enterprise is 3 kilograms of feed per kilogram of gain; top producers do better than this but the average ratio is about 3.6. The annual rate of turnover achieved might typically range from 2.4 to 4.0 and is an important factor in reducing other costs such as building and equipment costs per hog marketed.

Costs for the farrow-finish enterprise would reflect those presented above. While the specialists may gain some efficiencies, the combined enterprise avoids the uncertainties and costs of the weaner pig market.

A survey of hog producers in Western Canada found that larger swine enterprises had lower production costs per hog due to lower building and equipment costs, more litters per sow per year and lower death losses. They also produced higher quality hogs.

The cost of producing hogs fluctuates over time primarily as a result of fluctuations in feed prices; feed is an appreciably higher proportion of variable costs than of total costs. The longer term trend in hog costs is affected by any secular shift in feed costs (prices) and other input prices, and changes in technology. (Input prices trends are discussed in chapter 6 and changes in technology of hog production are outlined below).

Regional differences in hog production costs could occur as a result of differences in input prices, the opportunity costs of hog production, and differences in amounts of inputs required. This last item could result from differences in climate, pollution controls, etc., but is probably small. Grain production and other livestock production are alternatives, especially grain on the prairies. Feed prices (costs) differ between feed grain surplus and deficit areas by the cost of shipping the grain, grain pricing policies of the Canadian Wheat Board, and the tariff rate on United States corn.

12.2.4 Farm Structure

In 1971, 122,481 farms reported having pigs, only 52 percent of the number reporting pigs in 1961. Nearly all of the decrease in numbers occurred in the 1-32 pigs per farm category; for Canada as a whole, this number dropped by 60 percent between 1961 and 1971. Over the same period, the number reporting 178 pigs or more increased fivefold. As indicated above, larger producers tend to have lower production costs. Figure 12.2 gives census farms reporting pigs by size of operation in 1971.

Little information is available on the number or size of producers specializing in the sale of weaner (feeder) pigs. In general, they would be smaller in terms of number sold and more numerous than specialized finishing producers. In every province, at least 90 percent of producers selling market (slaughter) hogs sell less than 500 per year. The absolute and relative importance of large hog producers is greatest in Quebec where well over seven percent sell more than 1,000 hogs. The percentage in this size category in Prince Edward Island, Ontario, Manitoba and Alberta is about 2.5 percent.

12.2.5 Technology

The major technological advances over the last 25 years have been in the mechanization of feeding and manure disposal which allows substitution of capital for labour and is associated with the management efficiencies of confinement housing systems. In addition, management and research advances have improved nutritional knowledge and ability to formulate appropriate rations to minimize feed costs and obtain better pork quality; better breeds, the use of Record of Performance testing, as well as the use of antibiotics and other methods of controlling disease have improved efficiency. Because of these advances, it has been possible to increase the optimal size of enterprise, reduce production costs and improve the quality of pork produced.

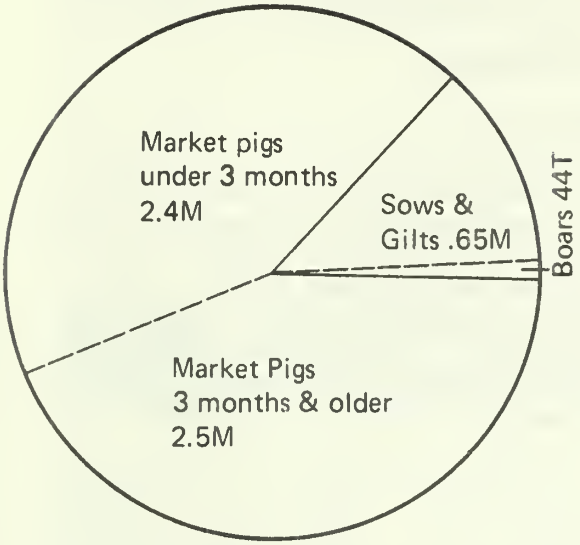


FIGURE 12.1
COMPOSITION OF HOG HERD, CANADA, 1976
(Total Number 5.7M)

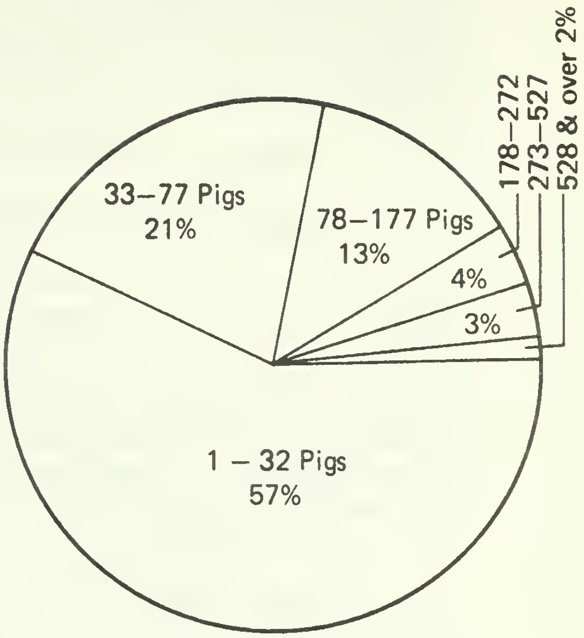


FIGURE 12.2
CENSUS FARMS REPORTING PIGS BY SIZE OF OPERATION, CANADA, 1971
(Farms Reporting 122, 481)

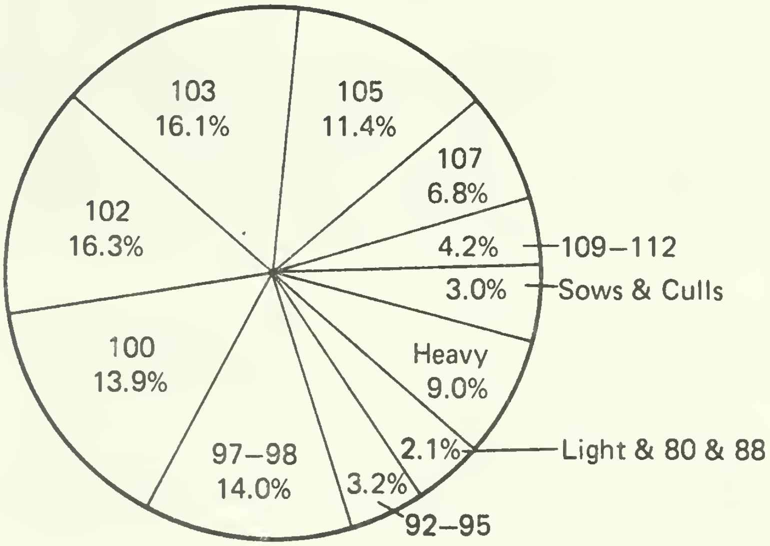


FIGURE 12.3
PROPORTION OF HOGS GRADED BY INDEX, CANADA, 1975[a]
(Total Graded 7, 875, 659)

M – million
T – thousand

Source (1) Statistics Canada, Cat. 23–005.
(2) Agriculture Canada, Livestock Market Review.

[a] For carcasses weighing 72 to 82 kilograms, 100 Index is an average hog with 0.85 – 0.87 centimeter of backfat. Carcasses in the same weight range with less backfat have higher grading indexes, are of higher quality and command premium prices.

Further improvements are still required particularly in the use of artificial insemination, procedures for freezing semen, reproduction in intensive production systems, disease control (piglet mortality for the time from farrowing to weaning is currently 25 percent) and use of garbage feeds.

12.2.6 Marketing and Pricing Systems

Feeder Pigs

There are no aggregate data on the numbers and prices of weaner (feeder) pigs sold in Canada. Weanling pigs and breeding stock are sold privately, by contract or by auction. There is no grading system or other government service for feeder pigs and only various testing programs for breeding stock. Feeder pig prices reflect the value of the pigs to the feeder. They are highly variable. A common pricing formula for weanling pigs is: weanling price = 1.5 X weanling weight X price per kilogram of dressed pork.

Market Hogs

The number of slaughter hogs marketed annually fluctuates between 7 and 11 million. About 90 percent are sold on the basis of their federal government carcass grade. These hogs are sold live at a price based on an Index 100 grade. Figure 12.3 gives the proportions of hogs graded by Index in 1975. The actual price paid is then determined by the grade index given to the carcass by the federal grader, adjusted for any imperfections (demerits) in the carcass. The grade index reflects the amount of back fat relative to the weight of the carcass (and indirectly intermuscular fat i.e.: the 'quality' of pork) and hence the percentage of lean meat. A carcass grading 103 with no demerits, for example, would be paid 103 percent of the agreed Index 100 price.

Determination of the Index 100 price differs by province depending in part on whether the province has a hog marketing board or not. The boards in Ontario, Manitoba and Alberta use a teletype auction system in which all packers have the opportunity to bid on all lots of hogs offered for sale. The boards in Nova Scotia, New Brunswick and Saskatchewan have some form of negotiated price, while the Prince Edward Island board sets the price using a formula based on the Ontario price.

Quebec is the only major producing province without a marketing board. Most hogs are produced and marketed under contract; the contracts can specify various production, marketing and pricing conditions and often involve feed companies. The balance are sold at public auctions.

New Brunswick, Ontario, Manitoba and Saskatchewan use some form of price pooling. No province limits production although Prince Edward Island has limits on the size of any one unit.

The Ontario, Manitoba and Alberta boards have alternative means of contracting for export sales to Japan. Prince Edward Island and British Columbia have producer contributory price stabilization programs. Hogs are one of the named commodities under the Federal Agricultural Stabilization Act. Federal government quality premiums ranging from $1 to $3 per hog were paid from January 1944 to December 1970.

The federal and provincial governments publish market price information daily and provide market analyses and outlook information on a regular basis.

12.2.7 Aggregate Production

Annual commercial hog slaughter averaged 10.3 million head over the period 1971-75, up 51 percent over the 1950-54 period (Table 12.1). Hog production has increased in all regions with the steadiest increase in Eastern Canada (Figure 12.4).

One of the key characteristics of hog production is its variability. Year-to-year changes often are in excess of 15 percent (Table 12.1). The 'hog cycle' of three to four years is evident in Figure 12.4. This production cycle results from the lag in producer expectations concerning the performance of changes in hog prices and feed costs (or the hog-barley price ratio) and the biological lag between a decision to change production in line with the expected prices and the time that hogs are ready for market.

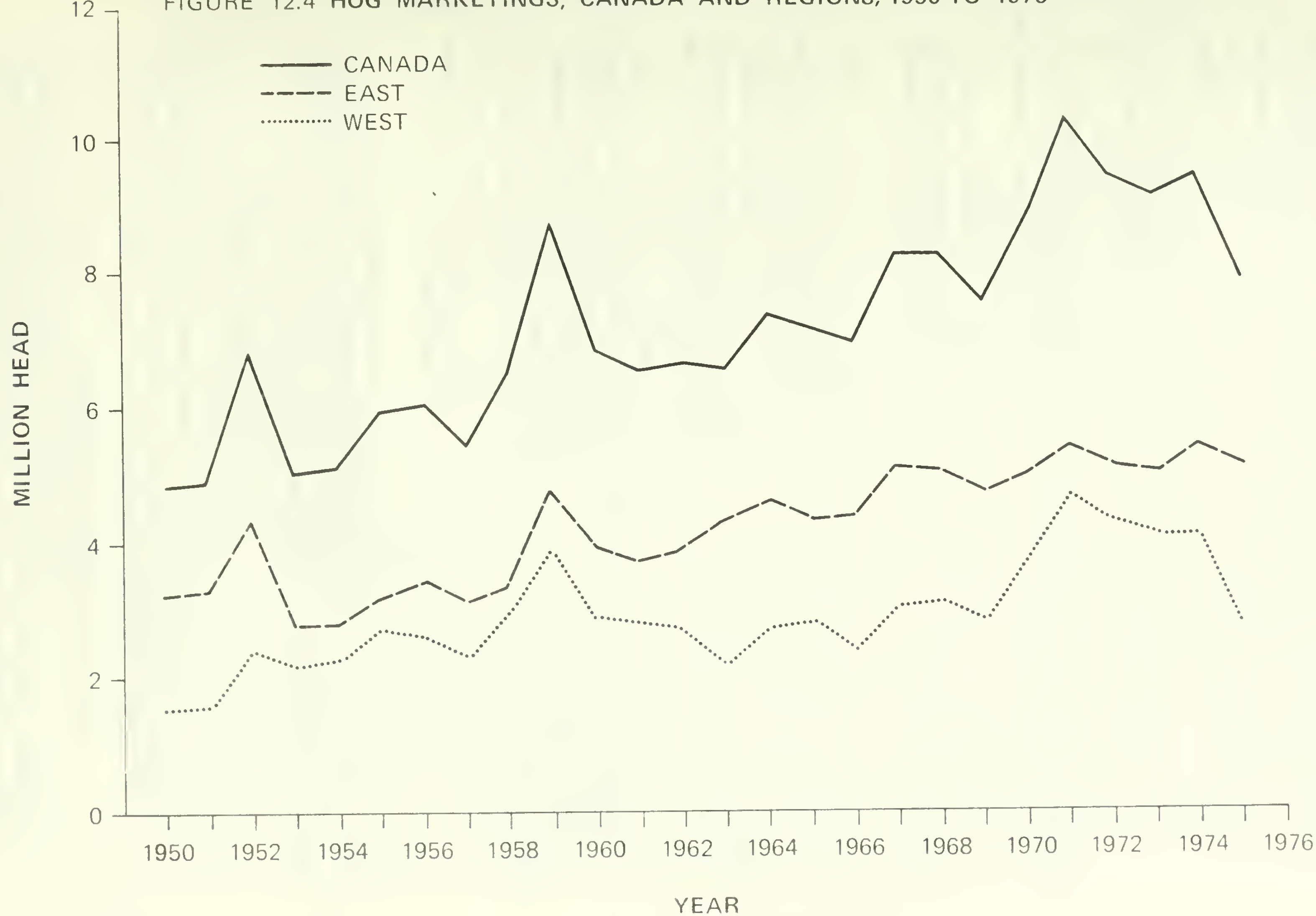
An analysis of the relationship between hog marketings, hog prices and feed costs over the 1961-72 period found that a one percent change in price was associated with about a 0.4 percent change in marketings 18 months later in both Eastern and Western Canada. Changes in stocks of grain in Western Canada and the price of feed grain in Eastern Canada were found to have lagged effects in hog marketing as expected.

Seasonal variation in production also is significant with April slaughter about eight percent above average and August slaughter about five percent below average.

The most significant changes in gradings between 1971 (a peak year) and 1975 are the decrease of 40 percent in Western Canada in response to the increase in grain prices, and the increase of 21 percent in Quebec. While two-thirds of the hogs are currently produced in Eastern Canada, the regional shares fluctuate appreciably over time.

Pork production per capita in Eastern Canada averages roughly twice as high as Western Canada. Few live hogs are shipped between regions. The quantity of pork shipped is difficult to determine but one estimate is that approximately 10 to 15 percent of Western Canadian pork production is shipped from the west to eastern markets.

FIGURE 12.4 HOG MARKETINGS, CANADA AND REGIONS, 1950 TO 1975



Source: Agriculture Canada, Livestock Market Review

Table 12.1 HOG OUTPUT AND FARM CASH RECEIPTS, CANADA, 1950 TO 1975

	Commercial Hog Output		Farm Cash Receipts				
	Slaughter[a]	Change	Hogs[b]	Change	Total	Change	Hogs as % of total
	000 head	%	$ Mil.	%	$Million	%	%
1950	6,793	+ 5	286.9	- 2	2,134.8	-12	13
1951	6,753	- 1	320.8	+12	2,735.5	+28	12
1952	8,057	+19	305.2	- 5	2,803.7	+ 2	11
1953	6,198	-23	263.7	-14	2,710.2	- 3	10
1954	6,144	- 1	278.7	+ 6	2,295.1	-15	12
1955	6,932	+13	254.0	- 9	2,272.4	- 1	11
1956	6,858	- 1	259.0	+ 2	2,534.3	+12	10
1957	6,295	- 8	282.8	+ 9	2,517.9	- 1	11
1958	7,466	+19	313.6	+11	2,814.4	+12	11
1959	9,662	+29	338.1	+ 8	2,776.0	- 1	12
1960	7,804	-19	266.8	-21	2,811.7	+ 1	9
1961	7,589	- 3	303.3	+14	2,923.7	+ 4	10
1962	7,698	+ 1	314.1	+ 4	3,182.2	+ 9	10
1963	7,622	- 1	307.6	- 2	3,214.6	+ 1	10
1964	8,296	+ 9	319.9	+ 4	3,504.1	+ 9	9
1965	7,932	- 4	368.4	+15	3,831.1	+ 9	10
1966	7,897		416.1	+13	4,313.6	+13	10
1967	9,268	+17	413.5	- 1	4,401.8	+ 2	9
1968	9,190	+ 1	408.3	- 1	4,377.4	- 1	9
1969	8,636	- 6	456.1	+12	4,242.7	- 3	11
1970	10,351	=20	484.5	= 6	4,250.8		11
1971	11,904	+15	428.7	-12	4,564.2	+ 7	9
1972	10,655	-11	507.5	+33	5,453,8	+19	10
1973	10,399	- 2	825.5	+45	6,839.9	+25	12
1974	20,289	- 1	787.7	- 5	8,866.6	+30	9
1975	8,358	-19	894.2	+14	9,790.3	+10	9

[a]Inspected.
[b]Includes supplementary payments.

Source: Census of Agriculture Division, Statistics Canada.

Regional production levels are determined by the location of markets, the relative costs of production including opportunity costs, and interregional transfer costs of pork and feed grain. Advantages enjoyed by hog producers in Ontario and Quebec include proximity to the major population centers in Canada and the United States, access to western feed grain under the favourable statutory freight rates, access to Canadian and United States corn, and, in varying degrees, feed freight assistance.

Hog producers in Western Canada have the advantage of local feed grain supplies, and proximity to the rapidly growing Japanese market and the pork deficit United States Pacific Coast. Yet, taken as a whole the pork industry in Western Canada suffers from instability; hog production boomed in the early 1970's when feed grain could not be marketed, but has fallen drastically as export markets for feed grains opened up and as grain prices have moved up relative to hog prices. Thus, hog production in Western Canada fluctuates more than in Eastern Canada due to the grain production alternatives.

12.2.8 Prices

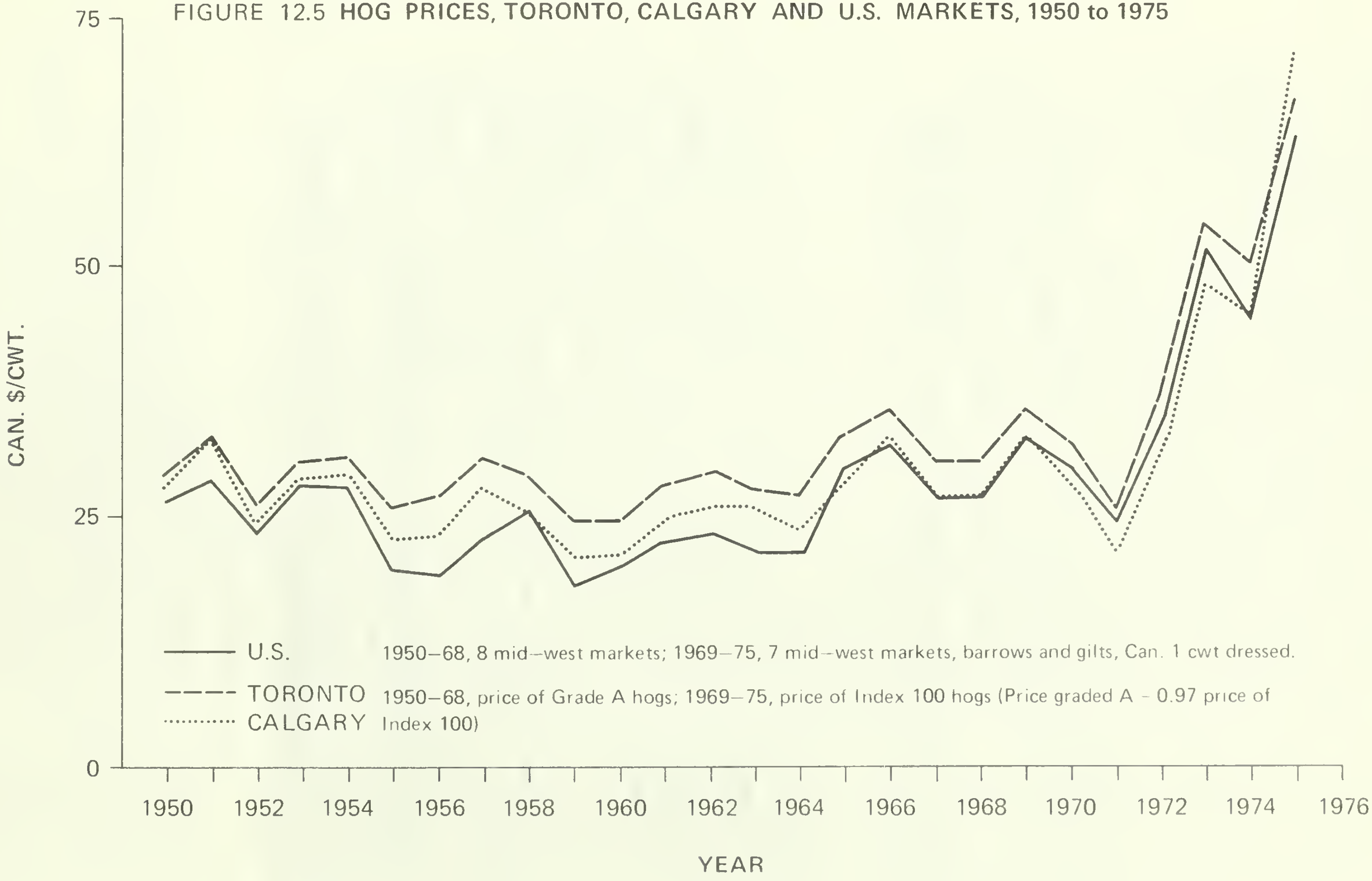
Hog prices showed little trend over the 1950-72 period (Figure 12.5). The sharp rise in price since 1972 reflected changes in the international markets for grain and pork. Year-to-year and cyclical fluctuations, as well as seasonal and irregular variability, are significant. This price variability is interrelated, of course, with production variability. The key factor, however, is the effect of the much larger United States market. The relatively free flow of pork between Canada and the United States and between Western and Eastern Canada ensures that these three sets of prices are closely related over time (Figure 12.5). Between 1970 and 1975, the average annual price at Toronto ranged from $1.60 to $5.20 Can. per hundredweight carcass above the average United States mid-west price and $3,80 to $6.00 above the Calgary price. The Canada - United States price differential narrowed in the early 1970's as Canada went on a more substantial export basis and has more recently widened reflecting a net import situation.

Although prices in current dollars showed little trend over the 1950-72 period, when account is taken of general inflation or of changes in feed costs, it is clear that real prices fell and that the margin over feed costs also fell. These reductions, combined with the growth in production, reflect the increases in productivity of the hog-pork sector. Even the large price increase since 1972 has only served to restore the real price levels of the 1950's (Table 12.2).

12.2.9 Income

Annual farm cash receipts for the swine enterprise averaged $769 million over the period 1972-75. This was 162 percent

FIGURE 12.5 **HOG PRICES, TORONTO, CALGARY AND U.S. MARKETS, 1950 to 1975**



Source: Agriculture Canada, Livestock Market Review.

Table 12.2 HOG CARCASS PRICES AT TORONTO, CURRENT AND CONSTANT DOLLARS, SELECTED FOUR-YEAR AVERAGES, 1950 TO 1975

	Toronto		
	Current	Deflated by	
Year	Dollars[a]	CPI[b]	SFPI[c]
- Canadian dollars per hundredweight carcass -			
1950-53	29.88	34.52	
1956-59	38.12	29.59	28.93
1968-71	31.13	24.57	28.95
1972-75	52.39	32.65	30.28

[a]1950-68, price of Grade A hogs; 1969-75, price of Index 100 hogs. (Price Grade A = .97 Price Index 100).

[b]Consumer Price Index, 1961 = 100.

[c]Swine Feed (Selling) Price Index, 1961 = 100.

Source: Agriculture Canada, Livestock Market Review, (various issues).

above the 1950-53 average. In constant dollar terms, however, the increase was 41 percent. Year-to-year variation in receipt is substantial (Table 12.1) and reflects the effects of fluctuations in prices and production.
Farm cash receipts from hogs as a percentage of total farm cash receipts declined from an average of 11.5 percent in the 1950-53 period to ten percent in the 1972-75 period. The relative importance of hogs varies appreciably by province. In 1975, hogs accounted for 14.1 percent of total farm receipts in the east and 5.5 percent in the west.

12.3 THE SECONDARY SECTOR

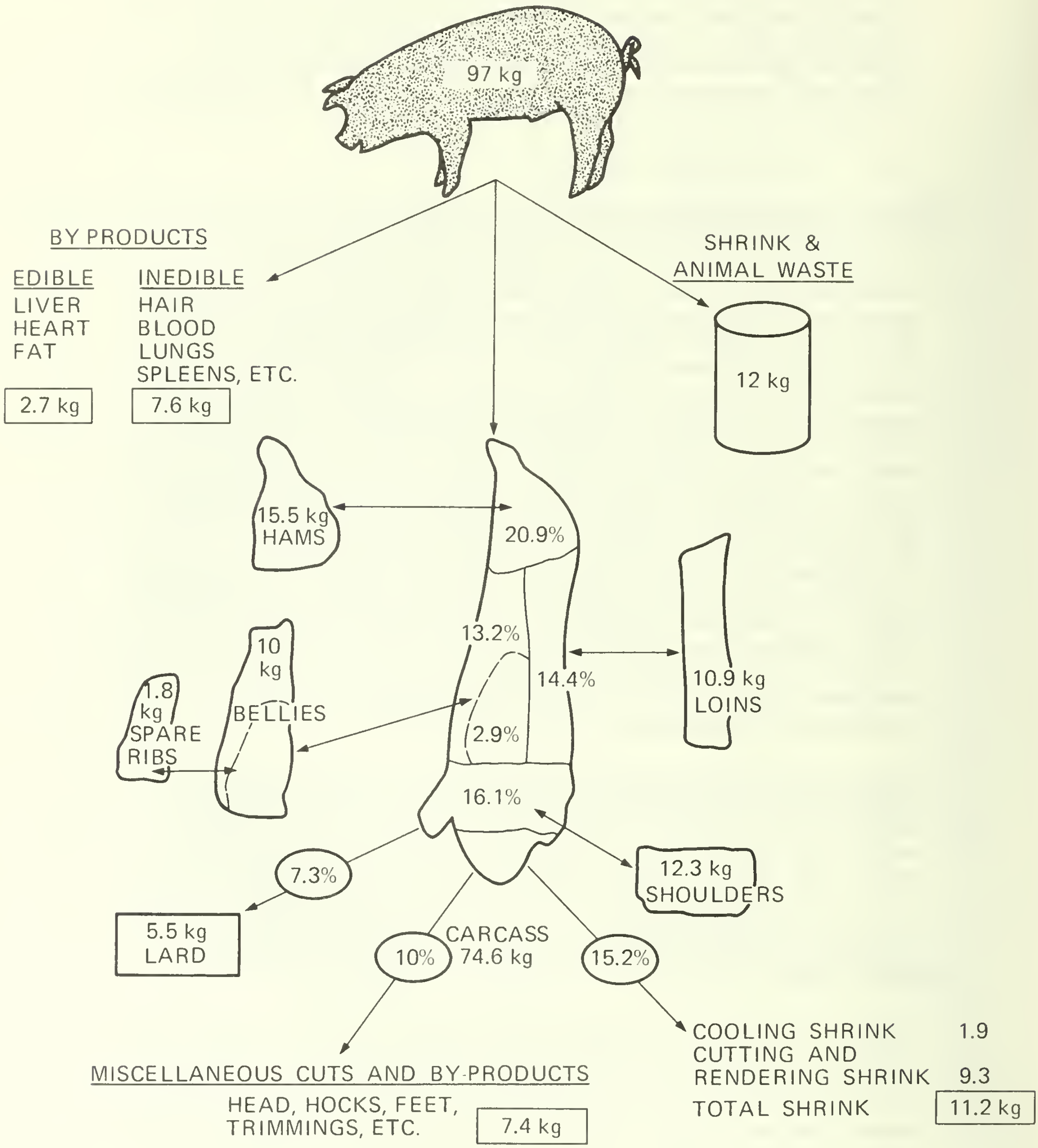
12.3.1 Industry Structure

The ownership of hog slaughtering capacity is highly concentrated in Canada and in every region, with the possible exception of Quebec. If only commercial slaughtering plants operating on a full time basis are included, there were about 120 plants slaughtering hogs in 1975. The five largest firms - Canada Packers, Burns, Swift Canadian, Intercontinental, and Schneider - operated 21 plants and accounted for 56 percent of output over the 1973-75 period. One or more of these five are among the five largest in every region. In 1975, regional five firm concentration ratios were 50 percent in Quebec and 66 percent in Ontario, 85 percent in the Atlantic region, and from 88 percent to 100 percent in the western provinces.
The number of plants slaughtering hogs in Canada totalled 148 in 1965, 17 more than in 1960. In 1970, the total had dropped back to 134 despite increases in Manitoba and Saskatchewan. By 1975, however, the total had jumped to 172; the largest increase was in Ontario, while only Quebec and British Columbia had fewer than in 1970. In 1975, there were 24 plants slaughtering approximately 150,000 head more.

Older meat packing plants tend to be large multi-species slaughtering and processing establishments, while the newer ones tend to be specialized in one or two species, some of which only slaughter. Most plants slaughter the hogs and sell both fresh pork in primal cuts (ham, belly, picnic, butt and back), and processed pork such as bacon and cured ham, as well as edible and inedible by-products. In Quebec, however, slaughtering and processing often take place in separate facilities.

Figure 12.6 shows the approximate composition of a market hog. The major types of processed products are (1) sweet pickled, (2) pickled and smoked (frequently fully cooked), (3) ground and mixed with other meats and fillers (e.g.: weiners) and (4) canned ham and luncheon meat. Processing is more important for some cuts than others. In terms of consumption, about 90 percent of hams are smoked, cooked or canned, 95 percent of bellies are smoked, 50 percent of shoulders are further processed and 15 percent of loins are sweet pickled or smoked

FIGURE 12.6 APPROXIMATE DISPOSITION OF A MARKET HOG



Source: Food Prices Review Board

backs. Slaughtering costs depend on the rate of utilization of given facilities, as well as on the size of plant. Total commercial slaughter in 1975 was 8.3 million hogs, compared to the peak of 11 million of 1971; hog slaughter in Western Canada is presently estimated at only about 40 percent of 'capacity'.

12.3.2 Resource Use and Value Added

There is no clear data on value added for pork alone, nor is there processing cost data available, except the cost of hogs. Estimates of value added and of costs are based on figures from the total red meat (beef, pork, mutton and lamb) industry. These are as follows.

For 1974, there were 487 establishments classified as "Slaughtering and Meat Processors". Materials and supplies used had a total value of $2.9 billion, of which $2.1 billion was for animals, including $719 million for hogs. The equivalent of 24,097 full-time production workers were employed and were paid $242 million. Expenditures for fuel and electricity totalled $20 million. Value added in manufacturing is estimated at approximately $635 million.

From the above figures and the apparent importance of hogs in the production and sales levels of processing plants, it is estimated that in 1974 the corresponding figures for hogs only were roughly $435 million for materials and supplies other than hogs, 12,000 production workers, $116 million for wages, $10 million for fuel and electricity, and $200 million for capital costs, profit, taxes, etc. Value added in manufacturing pork is estimated at about $318 million. Figure 12.7 gives the estimated value added component in swine production, processing and marketing cycles for a one-sow production unit.

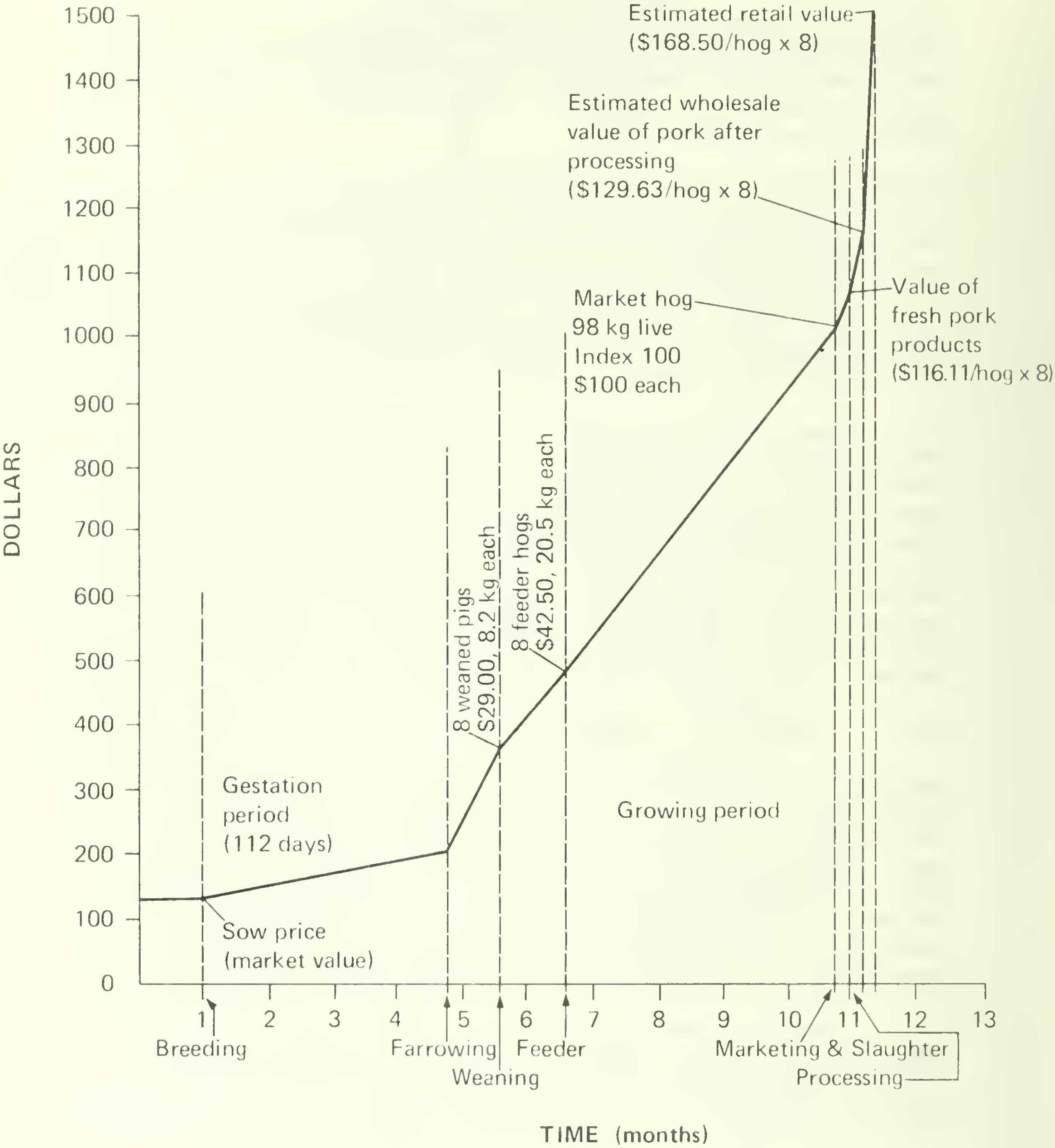
12.3.3 Technological Factors

Perhaps the most significant change in hog slaughtering and processing techniques in the last decade has been the introduction of 'jet-curing' for the processing of bellies, hams, picnics, etc. The packer can now accomplish in a few days what could have taken a week or more by the traditional process. This procedure has reduced interest rates in inventories and provided alternative utilization of cooler space while it has not affected the quality of product.

Two innovations under consideration by the Canadian industry are the 'hot-boning' of pork (cutting of hot rather than chilled carcass) and hide-pulling on the kill floor. These practices are in effect in some countries.

Many changes have taken place in the processed products over the last twenty years. The advent of vacuum-packaging has increased the shelf life of meat products as well as provided additional consumer protection. Vacuum-packing and the introduction of various sophisticated processing machinery have

FIGURE 12.7 **ESTIMATED VALUE–ADDED COMPONENTS IN SWINE PRODUCTION, PROCESSING AND MARKETING CYCLES, CANADA, 1975** [a]



[a] Estimates are for a one-sow production unit, time periods and values are subject to variation and should be viewed as representative only.

resulted in the manufacture of certain products being concentrated in fewer plants in order to take advantage of economies of scale. This, of course, has had adverse regional effects where plants have been closed.

The need for controlling pollution of rivers by the effluent of packing plants has been established. Guidelines for the industry are expected to be in place by the end of 1976 and will require a significant investment by many plants.

All fresh and processed pork entering interprovincial and export trade must be slaughtered and processed in federally inspected establishments. The provinces and some local governments also being involved in meat inspection, most pork entering intraprovincial trade is inspected as well. The United States inspects establishments shipping meat to that country. Sanitation requirements obviously are necessary and have an appreciable effect on the technology and procedures employed and on the cost of meat products.

12.3.4 Secondary Marketing and Merchandizing

As indicated above, pratically all fresh and frozen pork is shipped from the slaughtering plant in primal cuts. The packer, therefore, must price and merchandize these cuts in order to move all of them, i.e. 'balance' sales so that the stocks of no cuts become out-of-line with their production. Wholesaling also may be done through brokers or independent wholesalers or by the large retail chains for their own stores.

The retail cuts of fresh pork are prepared in the retail stores while most of the processed products are sold in pre-packaged form or sliced in the store. Fresh pork tends to have retail margins appreciably above those for beef presumably because the price of beef is considered to be a much more important factor in attracting consumers to the store.

12.3.5 Pork Consumption

During the period 1950-69, per-capita pork consumption generally fluctuated between 22.1 and 28.7 kilograms with a low of 20.1 in 1957. Over the period 1970-74, consumption appeared to reach a new plateau of around 26.2 kilograms per capita with a peak level of 30.1 kilograms in 1971 (Figure 12.8). About two-thirds of consumption is in processed form.

Short-term variability in pork consumption reflects primarily the impact of the changes in production and prices noted above and, fluctuations in the price of pork, beef and chicken have been found to be associated with 1.0, 0.1 and 0.3 percent changes in pork consumption, respectively, other things constant.

FIGURE 12.8 **PER-CAPITA DOMESTIC DISAPPEARANCE OF PORK, CANADA, 1950 to 1976**

Source: Statistics Canada, Cat. 32–226.

Longer term changes in pork consumption are associated with changes in population, longer term changes in relative meat prices (and to a lesser extent other food and non-food prices), changes in consumer incomes, changes in consumer tastes and preferences, and changes in alternative foods available.

Note:

(1) If the recent increase in feed grain prices is permanent, meat consumption can be expected to be lower than otherwise and pork will be relatively more expensive than both beef, which utilizes forages, and poultry, which uses grain more efficiently.

(2) Pork consumption is largely unaffected by changes in income - a one percent increase in income is estimated to increase pork consumption 0.13 percent, other things equal, much less than the 0.50 percent for high quality beef.

(3) Pork suffers more than other meats from an image of being a food relatively high in fat. Contrary to common belief, high quality pork cuts have less fat than high quality beef cuts and pork is as wholesome as any meat.

(4) The increasingly important Hotel, Restaurant and Institutional (HR&I) trade makes relatively less use of pork than beef, presumably reflecting the preferences of consumers. On average, Canadians consume roughly two kilograms of pork for every five kilograms of beef but in the HR&I trade the ratio is only 1:5.

(5) A few forms of pork appear to be susceptible to replacement by meat analogs (e.g.: bacon) but pork seems less likely to be extended with plant protein than is beef because less is used in ground form.

(6) Per capita pork consumption in 1986 is projected at 28.6 kilograms (chapter 7).

12.3.6 International Trade

Over the period 1950-1974, Canada was a net exporter of pork in every year except 1963 and 1969. Since 1975 however, a net import situation has developed. Neither exports nor imports are a large percentage of production - seldom more than seven percent - and the net level is appreciably less. Fresh cuts and processed products of various kinds and qualities move relatively freely between Canada and the United States because tariff rates are not very high and because the pork market, not unlike the market for beef, is really a North American one. Regional differences in production relative to consumption is an additional factor. This flow of pork across the border is the key factor in tying Canadian price levels in the larger United States market.

Fresh and frozen pork is the major category of both exports and imports, especially exports. Throughout the 1950's and 1960's, the United States took over 90 percent of Canada's fresh and frozen exports but by 1975 was surpassed by Japan. In the case of processed products, the United States became the major export market in the last half of the 1960's, taking 78 percent of the total. The United States is still the major market for processed pork exports but its share has slipped to less than

60 percent with the remainder going to a number of other countries.

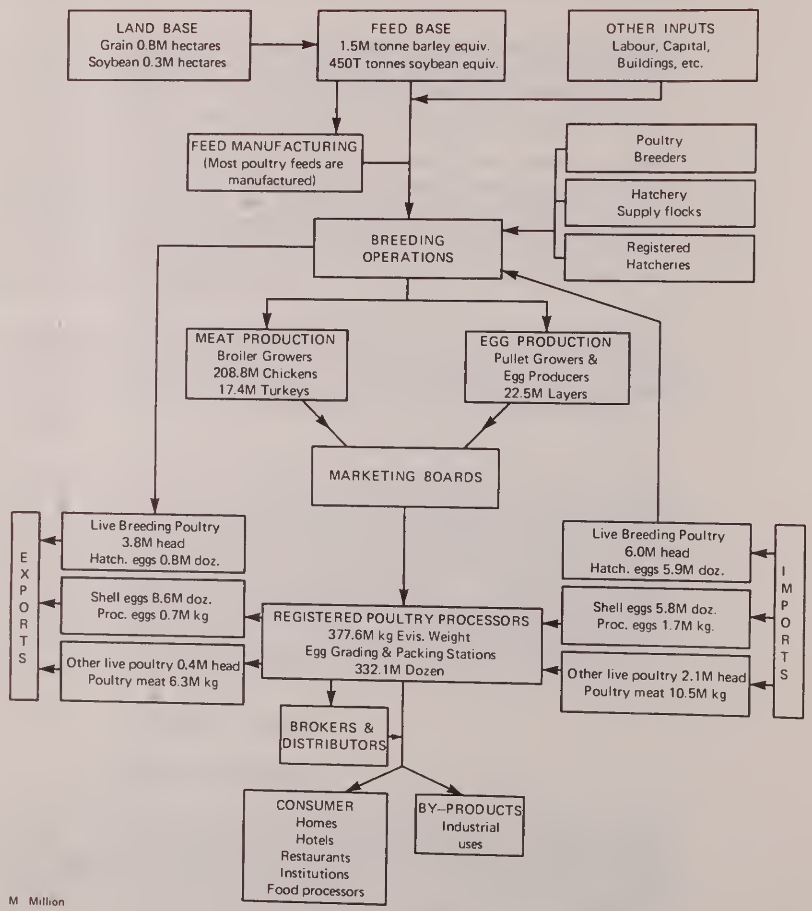
The United States supplies almost all of Canada's imports of fresh, frozen and processed pork. Only during the 1965-72 period did other countries (mainly Ireland) ship a significant quantity of fresh or frozen pork to Canada. Health restrictions preclude imports of uncooked pork from practically all other countries. Only since 1970 have other countries cut into the United States' share of the Canadian processed pork market. Poland, Denmark and Holland have the imported canned ham and canned luncheon meat market - in the United States as well as Canada.

A few market hogs are exported to the United States, primarily to the Pacific Northwest. Imports of hogs for slaughter are prohibited by disease quarantine restrictions. Many sows are shipped to the United States for slaughter because they are less penalized for excess weight. Boars and stags also are exported because they are heavily discriminated against by the Canadian system.

In terms of competing with United States producers for the North American pork market, Canadian producers have the disadvantage of the $3.15 per tonne (8 cents per bushel) tarriff on imported United States corn. Also, the heavier United States hog results in lower slaughtering and processing costs per pound of pork. Until recently, however, Canada enjoyed a premium market for heavy hams in New York and a market for some high quality processed products. The combination of historical market (United Kingdom bacon), breeds used, and a pricing and grading system favouring lean pork have given Canadian producers a quality advantage in these United States markets and in many other countries. An additional advantage is that the Canadian swine herd is relatively disease free and Canada's meat inspection standards are high. The limiting factors to increased exports are stability of supply at a competitive price. The increase in exports to Japan has been stimulated in large part by the relatively long term contracts negotiated by the hog marketing boards of Alberta, Manitoba and Ontario. Japan's import qutoa system, however, can be restrictive at times.

THE CANADIAN POULTRY SYSTEM

1975



M Million
T Thousand

1. Poultry meat and eggs are important Canadian agricultural commodities. The industry provided 6.8% of total farm cash income representing some $760 million in 1975. Retail value was estimated at $1.1 billion.

2. Poultry products are high quality, nutritious foods. Egg protein has the highest biological value of any natural protein and eggs are rich sources of vitamins and minerals. Poultry meat is low in fat, high in protein and an excellent alternative to red meats.

3. Production is based entirely on feed grains and protein, mineral, vitamin supplements. Protein supplements are primarily imported soybean protein from the United States. Most poultry feeds are manufactured by the feed manufacturing industry. Poultry are the most efficient converters of cereals to meat often achieving feed conversion ratios in the area of two kilograms of feed per kilogram of meat.

4. Poultry production is distributed across Canada and is located close to major population centres. In general, feeds are transported to production centres.

5. Slaughter and processing of poultry is an important secondary industry and provided an "added value" of about $260 million in 1975. Retail and distribution added another $188.5 million.

6. Production is domestically oriented, and the value of imports is currently almost twice that of exports. While Canadian production is not generally able to compete price–wise with United States products, there are export opportunities and Canada has the resource base for increased trade.

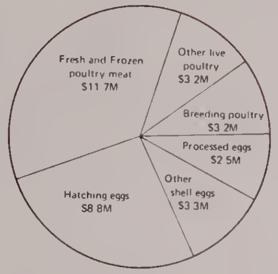
7. Canadian poultry production and processing is a high–technology business and is the most highly mechanized system in the animal production field.

8. Marketing of poultry and eggs is through provincially–controlled marketing boards which establish Canadian prices.

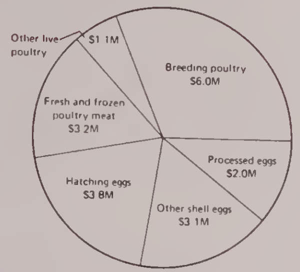
9. Since 1950, poultry meat consumption has doubled to 19.1 kilograms per capita. Medical concerns about cholesteral intake, most of which are controversial, have reduced per–capita egg consumption from 20 to 18.5 dozens in the last 25 years.

10. Future outlook for poultry products depends on such factors as, Canadian population increases, cost of feed grains and protein supplements, further developments of the HR & I trade, and development of trade opportunities. Canada has the feed and the protein production potential to meet any of these challenges.

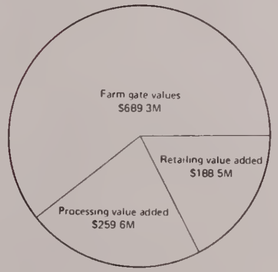
POULTRY IMPORTS
$32.7M



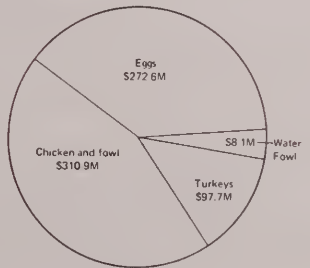
POULTRY EXPORTS
$19 2M



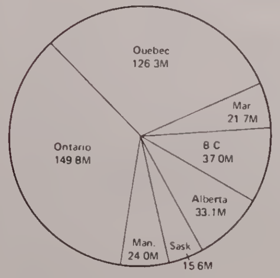
VALUE BY INDUSTRY SECTOR
$1137 4M



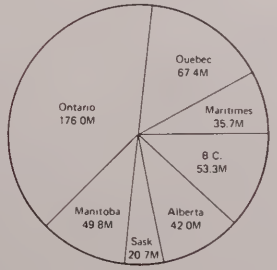
POULTRY PRODUCTS FARM GATE VALUE
$639.3M



POULTRY MEAT PRODUCTION BY PROVINCE
407 5M kg



EGG PRODUCTION BY PROVINCE
444.9M doz



13. THE CANADIAN POULTRY & EGG SYSTEM

13.1 INTRODUCTION

The Canadian poultry system is composed of three major sub-systems: eggs, broilers, and turkeys. The system makes a significant contribution to Canadians' way of life by offering highly nutritious foods which are an excellent dietary alternative to red meats and valuable supplements to cereals. Eggs have the highest biological value of any natural protein food, and poultry meat is nutritious, low in fat, and high in protein.

In 1975, Canada's total poultry meat production totalled 409 million kilograms, while egg production stood at 445 million dozens. The retail value of Canadian poultry products in 1975 was estimated at approximately $1.1 billion (Figure 13.1).

Poultry and poultry products are an important source of farm income, contributing 6.8 percent of cash receipts to farming operations in 1975. The farm-gate value of the system, including the contribution from the breeding and hatching sector, represents some $762 million. The processing and retailing industries add values estimated at $260 million and $189 million respectively.

Poultry are almost completely dependent on cereals and protein supplement; they are very efficient converters of feed, led by broiler chickens which commonly achieve feed conversion ratios in the area of two kilograms of feed per kilogram of meat output.

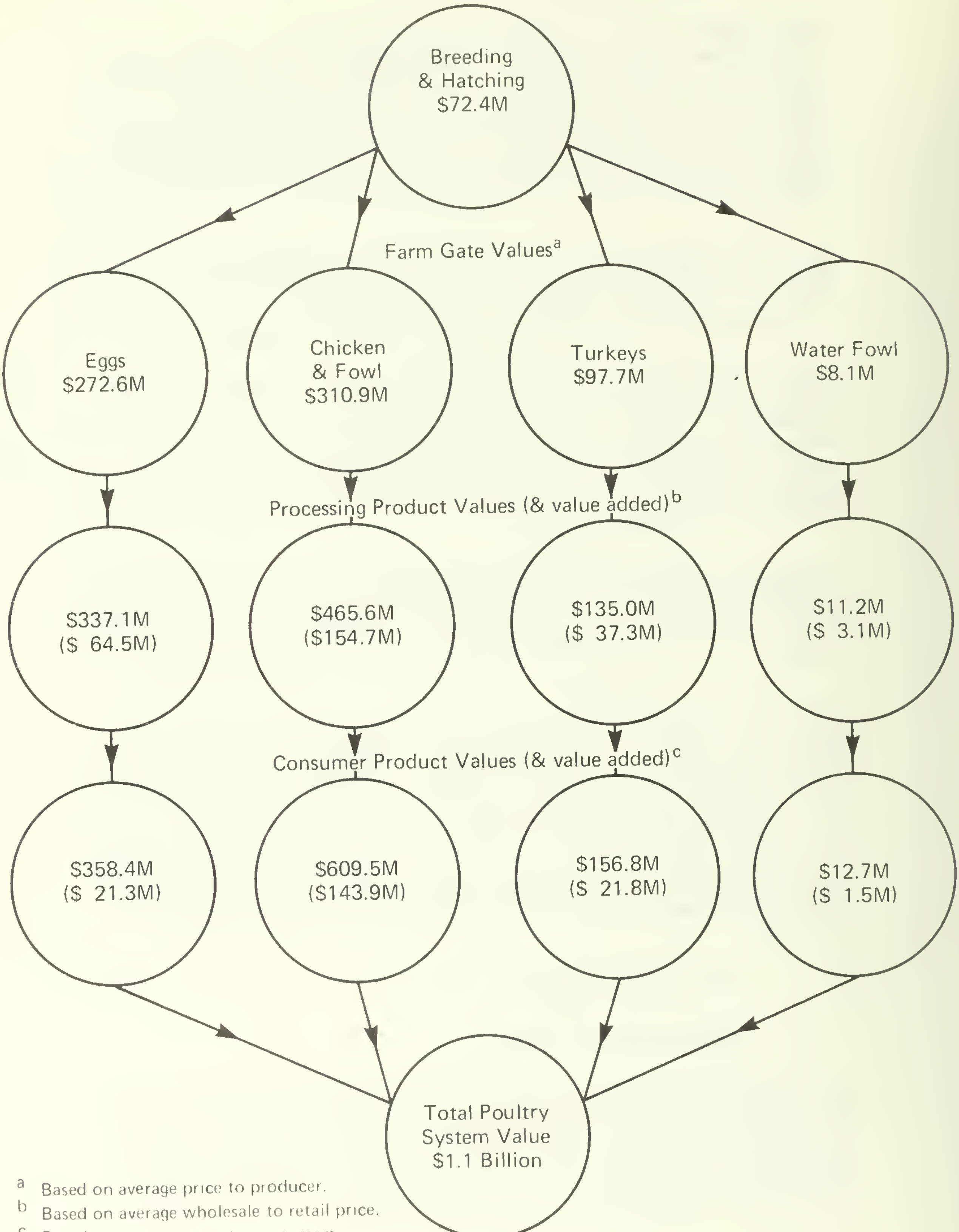
The poultry system is unique in its distribution across the country in almost even proportion to population concentration, with minor interprovincial movement. However, despite its significance in Canada, the Canadian poultry system is dwarfed by its United States counterpart with which it has had difficulty competing for various reasons, including economies of scale, labour rate differentials, and climatic conditions. In 1975, imports of poultry products, mainly from the United States, reached $32.7 million or about twice the value of exports.

13.2 THE PRIMARY SECTOR

13.2.1 Resource Utilization

If the estimated annual feed requirement of 1.5 million tonnes of barley equivalent and 450 thousand tonnes of soybean meal were supplied domestically, approximately one million hectares of crop land would be necessary. As it is, only about three-quarters of this land is in Canada with most of the soybean meal being imported from the Unites States.

FIGURE 13.1
VALUES AND VALUE ADDED, CANADIAN POULTRY SYSTEM, 1975



[a] Based on average price to producer.
[b] Based on average wholesale to retail price.
[c] Based on average price to consumers.

Poultry production has moved almost entirely to complete indoor operations, with a few exceptions in heavy turkey production. As a result, input requirements for energy and housing are high and land requirements are minimal, except for the disposal of manure and the production of feed. It is estimated that total investment in the primary sector of the Canadian poultry industry totalled $445 million in 1975. Poultry manure is being tested as a supplement to cattle feed and as a lawn conditioner. There is little regional variation in resources used across the industry.

13.2.2 Industry Structure

Poultry production has become highly specialized. While there is a certain amount of integration in the industry, each phase tends to be carried out as a distinctly separate operation under the control of autonomous entrepreneurs. The major components of the industry are:

(1) Primary breeders - a highly specialized, capital intensive segment requiring technical skill. There are only three Canadian breeders, one each for eggs, broilers and turkeys;

(2) Multiplier or hatchery supply flocks - franchised operations or wholly-owned subsidiaries of foreign companies which multiply the stock developed by the primary breeders;

(3) Hatcheries - purchase male and female lines from one or more of the primary breeding companies, with which they are usually integrated in some way, for crossing with their hatchery supply flocks;

(4) Started pullet production - independent units and some hatcheries produce, finance, and raise laying pullets in specialized facilities to a pre-laying stage rather than sell day-old chicks;

(5) Egg production - under quota guidelines, producers supply table and breeding egg requirements;

(6) Chicken broiler production - highly automated systems producing commercial weights in as little as five weeks;

(7) Turkey production - turkeys are produced in three categories: broilers under 4.5 kilograms, heavy hens 45-75 kilograms and toms over 7.5 kilograms.

(8) Waterfowl production - comprises only 1.2 percent of total production, with ducks forming the largest proportion;

(9) Feed manufacturers - integrated to a varying

extent with all production sectors to promote sales and achieve economies of scale.

In the last 25 years, the number of poultry producers in Canada has declined by 75 percent to approximately 13,000. At the same time, total production has increased dramatically, reflecting the trend to large specialized production units.

Regionally, the greatest consolidation has been in the Atlantic region, and least pronounced in the prairies. Prairie producers represented 90 percent of the total farms producing turkeys in 1971. However, in terms of product volume, they accounted for only 22 percent of the national total, while Ontario provided 42 percent of Canadian turkey production with only 4 percent of the producers.

13.2.3 Size of the Industry

The production of chicken broilers is accomplished through raising on average about 4.5 crops annually. As a result, the number of birds placed on farms gives a better indication of production trends than does the actual population of birds on farms at any given time (Table 13.1). Poultry meat production has more than tripled since 1950, climbing from 129 to 403 million kilograms in 1975. This growth has been largely attributable to the strength of broiler chicken sales, as turkey remains a product mainly for the festive seasons with relatively constant sales. Although production per bird has increased, the number of egg production birds placed on farms has fallen 22.9 percent since the peak of 29.2 million birds in 1970. This has been in response to the declining per-capita egg consumption and the increased production per bird.

The regional distribution of the Canadian poultry industry generally parallels the distribution of the human population (Tables 13.2, 13.3 and 13.4). Chicken meat production has the closest regional relation to population. Exceptions to this rule include Quebec which is deficient in egg production, and the prairies (chiefly Manitoba) where there is surplus production. Quebec is also low in turkey production, whereas Ontario and the prairies produce a surplus. The egg industry has declined in all regions since 1970-71. Similarly, the volume of chicken and turkey meat produced has fallen over the same period in Quebec, Ontario, and the prairies, although marginal increases in national terms have occured in the Maritimes and British Columbia.

13.2.4 Production Costs

Entry costs into the poultry business are becoming prohibitive. Capital investment costs, especially housing and land, have escalated rapidly in recent years. At the same time, new environment laws in some parts of Canada require an increased amount of floor space per bird in buildings, as well as more land area and tighter controls for manure disposal. The

Table 13.1 POULTRY STOCK PLACED ON FARMS, CANADA, 1965 TO 1975[a]

Year	Chickens for Egg Production	Chickens for Meat Production	Turkeys	Total
		- million birds -		
1965	22.8	135.1	16.8	174.6
1966	25.1	153.0	19.2	197.3
1967	24.9	156.1	18.3	199.3
1968	23.8	161.1	18.3	203.2
1969	27.1	187.9	18.0	233.0
1970	29.2	207.7	20.8	257.7
1971	24.5	198.1	19.0	240.6
1972	24.1	213.9	19.1	257.1
1973	25.9	223.2	21.7	270.8
1974	24.3	213.3	20.0	257.6
1975	22.5	208.8	17.4	248.7

[a]Not available prior to 1965.

Source: Agriculture Canada, Poultry Market Review, 1965 to 1975.

Table 13.2 PRODUCTION OF EGGS BY REGION, CANADA, SELECTED YEARS, 1950 TO 1975

Year	Maritimes	Quebec	Ontario	Prairies	B.C.	Canada
			- 000 dozens -			
1950	25,607	53,363	122,080	84,192	22,074	307,316
1955	31,980	56,279	143,182	117,010	26,907	375,358
1960	35,836	59,066	195,040	125,790	38,652	454,384
1965	31,949	78,008	169,514	105,326	46,554	431,351
1966	31,456	73,959	158,803	103,802	48,669	416,689
1967	29,497	75,001	168,567	107,755	53,911	434,731
1968	31,990	73,872	175,145	109,299	54,297	444,603
1969	41,485	73,134	178,725	114,336	56,343	464,023
1970	42,613	75,945	187,471	127,114	57,562	490,705
1971	41,287	73,547	192,618	123,870	58,341	489,663
1972	38,136	64,490	191,091	117,314	57,324	468,355
1973	37,813	59,518	190,718	116,774	56,872	461,695
1974	38,287	64,613	189,323	112,286	54,942	549,451
1975	35,721	67,419	175,966	112,518	53,301	444,925

Source: Statistics Canada, Cat. 23-202.

Table 13.3 FOWL AND CHICKEN MEAT PRODUCTION BY REGION, CANADA, SELECTED YEARS, 1950 TO 1975

Year	Maritimes	Quebec	Ontario	Prairies	B.C.	Canada
			- 000 kilograms -			
1950	5,563	18,875	53,176	28,573	4,122	110,308
1955	8,326	30,066	74,571	38,381	12,129	163,473
1960	8,324	41,496	65,105	34,241	13,534	170,881
1965	10,950	80,608	83,538	42,144	16,910	234,150
1966	13,392	90,340	88,186	47,246	19,264	258,428
1967	13,223	98,091	91,917	49,253	19,676	272,160
1968	13,314	100,656	90,437	48,452	19,586	272,445
1969	15,569	117,968	101,381	55,330	21,927	312,176
1970	17,602	126,388	107,868	65,600	23,741	341,199
1971	16,657	112,034	112,025	61,181	25,723	327,619
1972	17,999	119,577	115,795	62,106	28,531	344,007
1973	21,616	123,705	118,648	68,338	31,863	361,168
1974	19,842	121,317	119,982	62,679	31,352	355,171
1975	19,740	104,166	110,428	53,557	28,611	316,502

Source: Statistics Canada, Cat. 23-202.

Table 13.4 TURKEY MEAT PRODUCTION BY REGION, CANADA, SELECTED YEARS, 1950 TO 1975

Year	Maritimes	Quebec	Ontario	Prairies	B.C.	Canada
			- 000 kilograms -			
1950	634	3,257	4,975	7,771	2,146	18,781
1955	997	7,617	8,435	14,962	2,655	34,666
1960	692	6,021	18,258	20,170	3,788	48,929
1965	1,303	12,667	40,856	24,840	5,014	84,681
1966	1,401	16,358	49,336	23,290	6,491	96,876
1967	1,661	16,162	45,685	22,723	8,151	94,381
1968	1,278	16,176	45,087	20,943	7,594	91,078
1969	1,087	18,019	46,776	18,734	7,265	91,881
1970	1,417	23,265	47,170	21,792	8,769	102,412
1971	996	27,007	42,862	22,171	9,627	102,662
1972	1,176	25,163	40,056	21,742	8,749	96,886
1973	1,339	25,812	44,159	22,291	11,095	104,696
1974	2,223	30,060	43,896	23,375	10,421	109,974
1975	1,911	21,108	37,873	17,039	8,238	86,169

Source: Statistics Canada, Cat. 23-202.

difficulty in obtaining a production quota may also deter market entry by potential producers.

Between 60 and 70 percent of the total cost of poultry production is attributable to the cost of feed and these costs have escalated rapidly in recent years with the rise in world grain prices (Tables 13.5 and 13.6). As world demand for all types of grain increases, domestic feed costs also rise, putting poultry producers in a cost squeeze which affects production to differing degrees depending upon the size of operation, its geographic location, and the producer price levels established by marketing agencies.

As the vast majority of eggs and broilers are marketed fresh, and as transportation costs are rising, proximity to market is important. However, this contributes to the high cost of production because land prices in these areas are high due to competing demands.

As provincial minimum wage rates rose, and as comparable urban work continued to pay more, wages for male farm help (without board) rose 58 percent from $2.13/hour to $3.36/hour between 1973 and 1976. The trend is continuing, and it is placing an increasing strain on the costs of farm commodities. The situation is further complicated by the relatively low unemployment levels in some agricultural areas.

The poultry industry is also subject to pressure from increasing fuel and oil costs, and their related impact on the cost of transportation and packaging. The availability of credit, at reasonable interest rates, is a critical factor in production decisions.

13.2.5 Technology

In the twenty-year period following World War II, there were dramatic advances in the efficiency of poultry production.

Important among these were: greatly improved genetics of both laying and broiler birds (rate of lay, faster muscular growth, and greater disease resistance); much more efficient feeds and feeding programs; and reduction of the labour input through automation of all operations. Technical improvements have occured at a much slower pace in the last ten years, although health programs have reduced the incidence of many poultry diseases.

Poultry production and processing are among the most highly mechanized sectors in agriculture accounting for the small number of producers. One person can operate a unit of 50,000 layers capable of producing over 700,000 dozen eggs per year. An individual could also manage, in a year, 200,000 broiler chickens capable of providing 364 tonnes of meat. Poultry processing plants in Canada have become so mechanized that they

Table 13.5 DEALER'S AVERAGE SELLING PRICE FOR POULTRY FEEDS, CANADA, 1960 TO 1975[a]

Year	Chick Starter Mash 18-20%	Growing Mash	Laying Mash 17-20%	Broiler Starter Mash 20-23%	Turkey Growing Mash
		- dollars per cwt -			
1960	4.73	4.16	4.27	4.96	4.66
1965	5.24	4.56	4.58	5.47	5.10
1966	5.42	4.72	4.74	5.69	5.30
1967	5.56	4.87	4.89	5.70	5.36
1968	5.47	4.78	4.81	5.54	5.29
1969	5.37	4.65	4.70	4.51	5.17
1970	5.39	4.60	4.71	5.46	5.06
1971	5.42	4.68	4.75	5.45	5.16
1972	5.44	4.70	4.80	5.49	5.31
1973	8.29	7.03	7.42	9.05	8.40
1974	9.74	8.90	8.90	10.19	9.82
1975	9.71	8.94	8.84	10.0	9.97

[a]Not available for 1950 & 1955.

Source: Statistics Canada, Cat. 62-002.

Table 13.6 AVERAGE FARM PRICE OF EGGS AND EGG-FEED RATIO, CANADA, 1965 TO 1975[a]

Year	$/dozen	Egg-Feed Ratio[b]
1965	.353	7.77
1966	.418	8.89
1967	.337	6.96
1968	.364	7.61
1969	.415	8.91
1970	.354	7.73
1971	.306	6.64
1972	.345	7.22
1973	.530	7.39
1974	.592	6.77
1975	.570	6.56

[a]Not available for 1950, 1955, 1960.

[b]The egg feed ratio is the number of pounds of 17-20 percent laying feed that are equal in value to the farm price of one dozen eggs. Feed prices are weighted by the number of layers in each of five regions of Canada. Egg prices are based on the returns to farmers for all grades of market eggs.

Source: Statistics Canada, Cat. 23-202.

are slaughtering and preparing for market up to 5,000 broiler chickens per hour, and egg stations can grade and carton over 8,000 dozen eggs per hour.

The major input cost in egg and poultry meat production being for feed, continued research emphasis needs to be placed on means of improving feed efficiency, eliminating loss due to mechanical failures, and decreasing the labour input component. In view of projected growing world demand for grain, there is also a need for more research into identifying substitutes for high priced feed grains.

13.2.6 Primary Marketing

Historically, the poultry industry has been notably independent of government assistance. Prices fluctuated markedly but there was little or no subsidization. Producers who adopted the rapid technological advances and combined them with good management survived the process of attrition; others did not. The implementation of supply management in the 1970's has had a tremendous stabilizing impact on the poultry industry. Egg and turkey producers now have national marketing agencies. Broiler chicken producers presently under provincial marketing agencies, have applied to become organized nationally.

In its early development, the Canadian Egg Marketing Agency (CEMA) experienced great difficulty in putting supply management into effect. After a long and determined effort by the federal and provincial governments, and by producers from all parts of Canada, a supplementary agreement was put into force pending the negotiation of a revised comprehensive plan. Major developments since 1974 have included a new approach to financing the Agency's egg surplus removal program, centralization of pricing and selling operations with CEMA, the establishment of import quotas, and a positive egg promotion program to reverse the decline in consumption.

The Canadian Turkey Marketing Agency (CTMA) became a reality in 1974, with limited authority over the inter-provincial and export trade in turkeys. In addition, it was given some control over intra-provincial movement which was allowed through delegation of limited provincial authority to the federal government. In its second year of operation, the CTMA achieved a workable balance between production, consumption and stocks, with storage inventories amounting to 21.4 million kilograms. Regulations introduced during the fiscal year 1975/76 were concerned with licensing, issuing quotas and pricing for turkey meat marketed by producers in inter-provincial or export trade.

At present, broilers are marketed in Canada through provincial marketing boards which regulate volume and price. Most primary industry members feel that the establishment of a marketing agency is necessary to ensure that production and processing costs are met and that lower-priced chicken imports from the United States, which reached 22.7 million kilograms in 1976, are restricted in their entry into Canada. An application requesting the formation of a National Broilers Marketing Agency has been made to the National Farm Products Marketing Council.

The quota system has already added a previously unrealized degree of stability to production, pricing, farm income, and other related characteristics of the poultry system. It remains to be seen whether these controls will take a form which will retain incentives to keep the industry efficient.

13.3 THE SECONDARY SECTOR

The secondary sector of the poultry industry is concerned with all the stages that affect the product after it leaves the farm gate, including the grading, packing, and processing (breaking, freezing and drying) of eggs, the killing, eviscerating and marketing of poultry, and the supplying of such inputs as pharmaceuticals and production equipment.

13.3.1 Industry Structure

The processing industry is concentrated in areas of dense human population. The Maritimes have few processing plants, while Ontario and Quebec have the greatest numbers. The trend has been towards a gradual decline in the number of registered processing establishments, except in the case of eggs in the Maritimes and British Columbia.

In common with all agriculture and food-related industries, poultry and egg processing operations are shifting to fewer and larger plants (Table 13.7), and specializing in specific products or processes. The processing sector of the poultry and egg industry in Canada is characterized by mass production systems operating on low unit margins and producing highly perishable goods that have to be marketed in the shortest possible period of time to avoid spoilage and/or high storage costs. Prior to the establishment of marketing agencies, processors often contracted with producers in advance, or integrated into the production sector in order to assure uniform quality and to pre-plan production schedules. In 1975, 114 eviscerating and killing plants in Canada processed 377.6 million kilograms of poultry, which represented over 90 percent of all birds raised in Canada. Of the near 4 billion eggs that were graded in the 624 egg stations, 75 percent went to the shell egg market, seven percent were processed by plants producing 16.4 million kilograms of egg products, five percent were hatching eggs and 13 percent were eggs marketed or consumed by producers.

The industry will be subject to more stringent health regulations in the near future. Regulations in the United

Table 13.7 NUMBERS OF PROCESSING PLANTS, CANADA, SELECTED YEARS, 1952 TO 1975

SHELL EGGS[a]

Year	Maritimes	Quebec	Ontario	Prairies	B.C.	Canada
1952	101	230	542	396	63	1332
1955	103	232	531	336	62	1264
1960	98	214	457	303	68	1140
1965	107	179	375	229	91	981
1970	113	89	228	207	100	727
1975	116	80	170	172	86	624

PROCESSED EGGS

Year	Maritimes	Quebec	Ontario	Prairies	B.C.	Canada
1952	0	4	21	35	3	63
1955	0	2	17	29	3	51
1960	0	2	16	28	5	51
1965	0	3	17	14	6	40
1970	1	2	12	9	5	29
1975	1	2	10	5	3	21

POULTRY MEAT

Year	Maritimes	Quebec	Ontario	Prairies	B.C.	Canada
1952	37	94	146	122	45	444
1955	31	76	157	123	43	430
1960	44	78	162	135	50	479
1965	25	59	67	56	26	233
1970	10	42	47	39	12	150
1975	20	39	44	26	15	144

[a]Grading and packing plants.

Source: Agriculture Canada, Poultry Market Review, 1952 to 1975.

States and Canada already demand that egg products be pasteurized to keep salmonella contamination under control. The entire industry will soon be called upon to certify all their products free of contaminant residue and salmonella. As feed, egg, and poultry producers will be involved, the industry will have to cooperate through an organization of its own to meet these regulations.

The growth of the poultry industry has been accompanied by an increase in the number of input supply firms. Pharmaceuticals have provided disease control and vitamin supplements for diets. Housing and production equipment, such as automatic feeders and waterers, have become highly specialized, as has equipment used in production line slaughtering and eviscerating. These input suppliers have helped the poultry industry achieve more efficient feed conversion, increase profit, and reduce labour input. The latter has been a much required improvement because the many labour opportunities within the secondary sector do not catch the interest of prospective employees. Also, because Canadian labour rates in this industry are presently much higher than those in some regions of the United States, it may continue to require protection to remain viable domestically.

13.3.2 Secondary Marketing

Although independent from the primary sector, secondary marketing and merchandizing groups must deal with the price-setting mechanisms imposed by provincial and national marketing boards. The controls of marketing boards, which extend through price-setting at the farmgate, have reduced the extent to which poultry and egg products are used as loss leaders.

In comparison with the marketing of pork and beef products, that of poultry products is relatively uncomplicated. The bulk of eggs are marketed in the shell, and most poultry meat is sold as eviscerated whole or cut-up carcasses. Further processing, by which eggs are broken and frozen or dried, and meat is canned or made into modified products, represents a small fraction of the business, estimated at 5 percent or less of total production.

Complaints by consumer and producer groups point clearly to the need for better information exchange throughout the marketing system. In order to maintain the viability of the industry and to provide for optimal economic gains, a strong public relations and promotion program needs to be established. A need also exists to monitor the Canadian poultry system at all stages from the farm to the consumer, and to establish an information system capable of producing accurate market indicators for marketing agencies, producers and processors in all regions.

The relative size of the Canadian poultry industry and its proximity to the United States, the largest poultry producer in the world, has always created an atmosphere of uncertainty for it. Although the quota system presently operating in the Canadian egg and turkey industries has removed much of this uncertainty, much controversy still surrounds supply management, if only to mention the question of what organization should control the issuance of import permits and be the first receiver of imported products.

13.3.3 Consumption

Changing retail prices, the public's acceptance of theories concerning the relationship between dietary cholesterol and heart disease, changes in meal habits and the price fluctuations of competing products have contributed to the variability in the per-capita consumption of poultry and eggs (Table 13.8). Until the invocation of supply management, these factors caused an instability within the industry which could not be compensated for.

Consumption of Eggs

The per-capita consumption of eggs declined by 13 percent to 18.5 dozen in the period 1960 to 1975 (Figure 13.2). The cholesterol issue in the human diet has played the major role in reducing egg consumption, almost completely eclipsing the fact that eggs contain the highest quality protein plus many vitamins and minerals and play a vital role in the nutrition of Canadians. Until government and industry financed research can elucidate the question, efforts need to be made towards maintaining the egg industry, since the evidence surrounding the cholesterol issue is very conflicting.

Some knowledgeable sources believe that the recent decline in per-capita egg consumption has reached a plateau, and that this trend can now be held in check or reversed. Innovative marketing techniques in the United States have proven successful in reversing such downward trends in many test markets. As the Canadian situation is thought to be comparable, similar marketing efforts in Canada might achieve positive results.

Consumption of Poultry Meat

The per-capita consumption of poultry meat has grown steadily from 8.2 kilograms in 1951 to 21.3 kilograms in 1973, only slipping to 19.1 kilograms in 1975 (Figure 13.2). Although the per-capita consumption of chicken has increased dramatically in the past, this is still some 4.5 kilograms per capita below that in the United States. Given our expected increase in population and a continued increase in per-capita consumption, the industry will have some room for growth. However, increases will depend upon price. The Economic Council of

Table 13.8 VARIABILITY OF CONSUMER PRICES AND POULTRY CONSUMPTION, CANADA 1961 TO 1975

<table>
<tr><th>Year</th><th>Eggs</th><th>Chicken</th><th>Turkey</th><th>Eggs</th><th>Chicken[a]</th><th>Turkey[b]</th></tr>
<tr><td>1961</td><td>100.0</td><td>100.0</td><td>100.0</td><td>100.0</td><td colspan="2">100.0</td></tr>
<tr><td>1962</td><td>99.1</td><td>100.0</td><td>101.3</td><td>94.6</td><td colspan="2">102.3</td></tr>
<tr><td>1963</td><td>94.7</td><td>103.7</td><td>109.2</td><td>103.7</td><td colspan="2">105.0</td></tr>
<tr><td>1964</td><td>94.7</td><td>112.1</td><td>113.2</td><td>82.5</td><td colspan="2">72.7</td></tr>
<tr><td>1965</td><td>93.8</td><td>116.8</td><td>125.0</td><td>88.3</td><td colspan="2">74.8</td></tr>
<tr><td>1966</td><td>90.7</td><td>126.8</td><td>135.5</td><td>104.3</td><td colspan="2">80.7</td></tr>
<tr><td>1967</td><td>92.0</td><td>135.8</td><td>136.8</td><td>96.1</td><td colspan="2">106.6</td></tr>
<tr><td>1968</td><td>92.5</td><td>135.3</td><td>128.9</td><td>98.9</td><td colspan="2">109.6</td></tr>
<tr><td>1969</td><td>94.7</td><td>154.7</td><td>131.6</td><td>109.9</td><td colspan="2">109.2</td></tr>
<tr><td>1970</td><td>96.0</td><td>164.7</td><td>132.9</td><td>99.0</td><td>107.7</td><td>99.1</td></tr>
<tr><td>1971</td><td>94.2</td><td>157.4</td><td>135.5</td><td>87.3</td><td>112.0</td><td>95.8</td></tr>
<tr><td>1972</td><td>90.7</td><td>165.3</td><td>136.8</td><td>94.7</td><td>128.9</td><td>105.4</td></tr>
<tr><td>1973</td><td>85.8</td><td>172.6</td><td>134.2</td><td>179.2</td><td>134.8</td><td>153.0</td></tr>
<tr><td>1974</td><td>84.1</td><td>164.2</td><td>138.2</td><td>198.4</td><td>152.6</td><td>174.6</td></tr>
<tr><td>1975</td><td>81.9</td><td>153.2</td><td>125.0</td><td>197.0</td><td>168.5</td><td>180.4</td></tr>
<tr><td colspan="4">Direct Price Elasticity[b]</td><td>-.1207</td><td>-.5637</td><td>-.1090</td></tr>
<tr><td colspan="4">Income Elasticity[c]</td><td>0</td><td>.1490</td><td>.5181</td></tr>
<tr><td colspan="4">Expenditure Proportion[d]</td><td>.007204</td><td>.007593</td><td>.002629</td></tr>
</table>

[a]Not reported separately prior to 1970.

[b]The expected change in demand for a one percent increase in price.

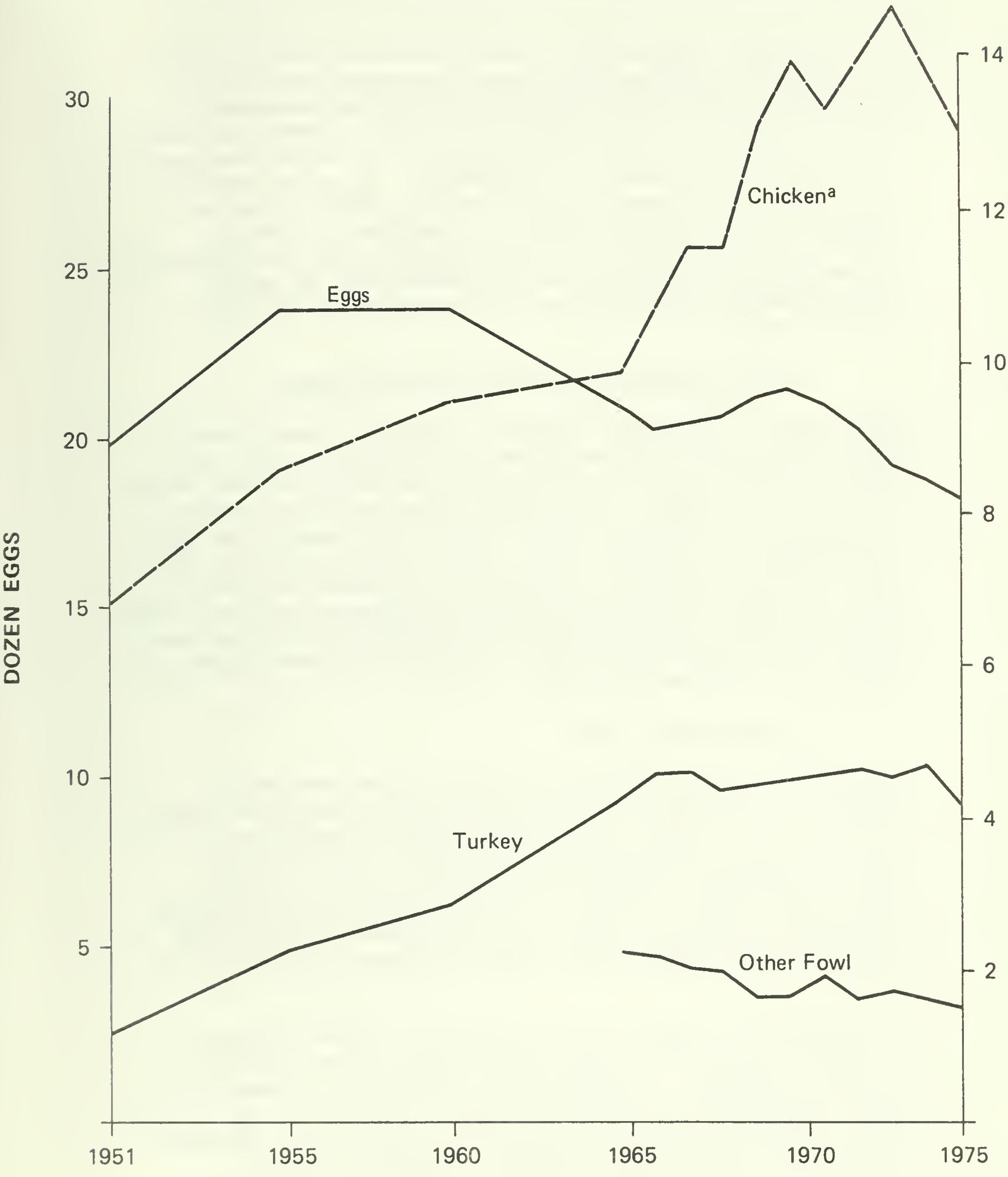
[c]The expected change in demand for a one percent increase in income.

[d]Proportion of total family expenditure as reportedc by Statistics Canada in 1969 Family Food Expenditure Survey.

Source: (1) Statistics Canada, Cat. 23-202 and 62-002.
(2) Hassan Z.A. and Johnson, S.R., Consumer Demand for Major Foods in Canada, Agriculture Canada, Ottawa, 1976.

FIGURE 13.2

PER-CAPITA CONSUMPTION OF POULTRY & EGGS, CANADA, 1951 to 1975



[a] 1951, 1955 and 1960 data include other fowl.

Source: Agriculture Canada, Poultry Market Review, selected years.

Canada projects that total poultry meat production by 1980 and 1985 will be 550 million kilograms and 636 million kilograms respectively; chicken meat is expected to retain or increase its present percentage of the annual total, which ranges between 66 and 70 percent.

The per-capita consumption of turkey fell to a ten-year low of 4.3 kilograms in 1975. The producer quota for 1976 has been increased to 91 million kilograms, nonetheless remaining substantially below the all-time high quota. This would imply that the Canadian Turkey Marketing Agency is moving cautiously as per-capita consumption is increasing. As turkey competes with other meats (especially ham) on the market, price and promotion will be major factors in regaining lost sales. Encouragement of production and of research and development in further processing, as well as the development of export markets, present opportunities for expanding the Canadian turkey industry.

Hotel, Restaurant and Institutional Market

Rapid growth in the HR&I trade has occured in recent years. Marketing efforts could see growth in this traditional egg market which has gradually been losing ground to instant cereal and convenience foods. The growth of the fast-food industry, and specifically Kentucky Fried Chicken Ltd. whose sales have risen from 19.2 million birds in 1970 to 34.3 million in 1976, illustrates the potential this market represents for broiler sales. Turkey is consumed largely as a festive food, but could be promoted and popularized for more general use, as has been done by the United States turkey industry with some success in Japanese and European markets.

13.3.4 International Trade

Unfavourable feed/poultry price ratios in the developed countries in the first half of 1975 resulted in reduced output for the year as a whole, the first setback to expansion in these countries' poultry meat production in the post-war period. There was a substantial increase in the centrally planned countries, and growth in the developing countries was estimated as close to average. The increase in total world production was, however, small and well below the longer-term trend.

Internationally, poultry and eggs are not traded extensively. The United States, and some EEC and eastern block countries are the major traders. If supplies were available at competitive prices, Canada might be able to secure a portion of the limited export markets for poultry products and specialized technology, especially in developing countries. However, poultry production technology being highly transferable, poultry operations, even in these countries, often approach the level of sophistication reached in advanced countries.

The flow of Canadian exports and imports tends to tip in favour of the latter, and usually runs between 2 and 5 percent of domestic production (Table 13.9). Canadian trade is predominantly with the United States, with whom Canada generally has not been able to compete on a price basis because of its higher production costs. Under supply management, the volume of eggs and turkey meat which may be imported is set by law; however, if shortages occur, supplementary import permits may be issued.

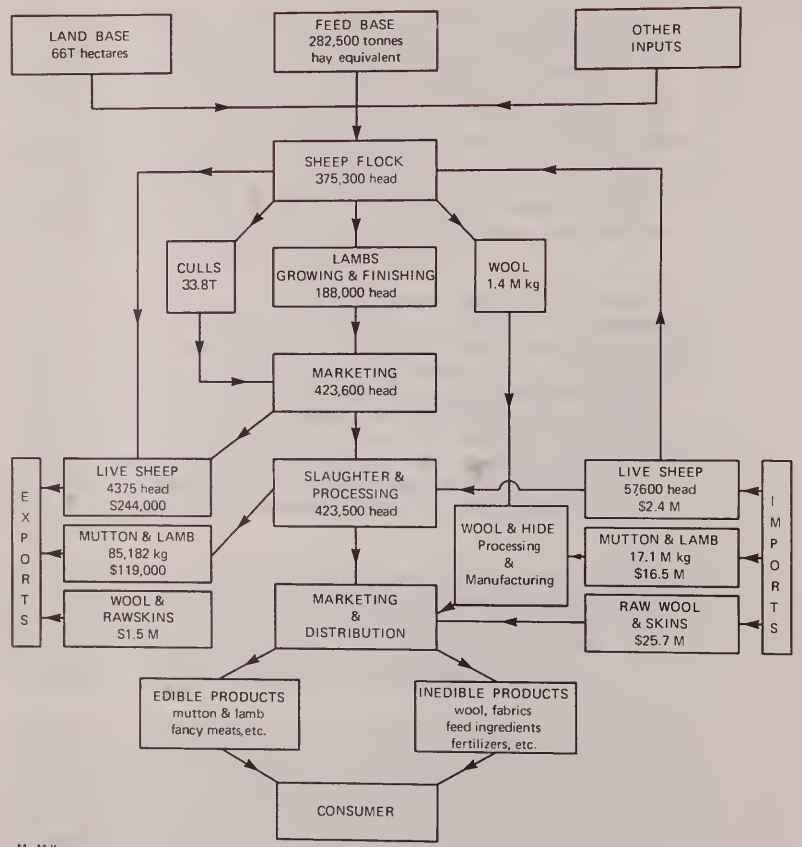
Table 13.9 CANADIAN TRADE IN POULTRY PRODUCTS, SELECTED YEARS, 1950 TO 1975[a]

Year	Imports	Exports	Trade Balance
1950	5,168	15,356	+10,188
1955	16,997	7,002	- 9,995
1960	10,963	3,951	- 7,012
1965	10,856	3,289	- 7,567
1966	15,667	5,121	-10,546
1967	17,138	5,756	-11,382
1968	16,217	5,567	-10,650
1969	17,300	6,661	-10,639
1970	15,352	11,287	- 4,065
1971	10,942	10,823	- 119
1972	15,012	7,873	- 7,139
1973	19,156	17,108	- 2,048
1974	24,590	24,186	- 404
1975	32,671	19,233	-13,438

[a]As categories have changed, figures are not strictly comparable over wide time periods. Products included: baby chicks, turkey poults, other live poultry, chickens fresh or frozen, turkeys fresh or frozen, other poultry fresh or frozen, hatching eggs, other shell eggs and processed eggs.

Source: Statistic Canada, Cat. 65-202 and 65-203.

THE CANADIAN SHEEP SYSTEM
1975



M Million
T Thousand

1. In 1975, farm cash receipts from sheep and lambs represented 0.13 percent of total farm cash receipts at $13,467,000 from 14,000 (1971 census) producers. The sale of wool accounted for six percent of the above total. There has been a steady decline in sheep numbers in Canada since 1950.

2. The recorded average per–capita consumption of lamb and mutton is 1.3 kilogram. This does not include a significant quantity of light lamb sold at high prices directly to ethnic buyers, particularly at Easter and other festive seasons. Light lamb production is of greatest importance in eastern Canada, while heavy lamb production is most important in the west.

3. The principal sheep producing provinces, in order of importance, are Alberta, Ontario, Saskatchewan, Quebec and British Columbia.

4. In 1975–76, a total of 183,002 sheep and lambs were slaughtered in 74 federally inspected plants and 104,332 sheep and lambs were slaughtered in 300 provincially inspected plants.

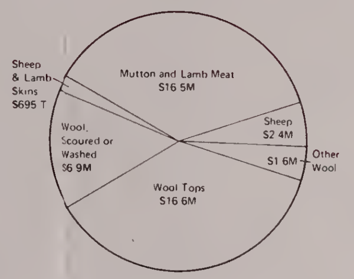
5. Canada imported $44.5 million worth of mutton, lamb and wool in 1975. This represents about 75 percent of our meat and 90 percent of our wool requirements. This did not include the large quantities of imported woollen fabrics and finished garments. Exports of meat and wool amounted to only $1.9 million.

6. Lambs are marketed through stockyards, direct to packers or at the farm gate. The last category represents about 47 percent of Canadian production. It is not included in published marketing statistics which result from sales in stockyards or to abattoirs.

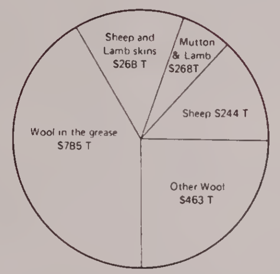
7. Sheep as ruminants are capable of utilizing a wide range of feeds including grasses, crop residues, browse and by–products of cereal production. This, together with modest labour requirements, makes them a good farm complementary enterprise.

8. The potential for expansion of the sheep industry lies in their biological efficiency, as a ruminant, and in the land, forage and waste resources available. There is a potentially strong demand for fresh lamb and a large market for wool. Imports presently meet much of this demand. Various programs are in place to support the industry on the basis of the potential that exists.

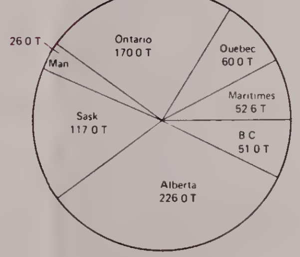
IMPORTS
$44.5 M



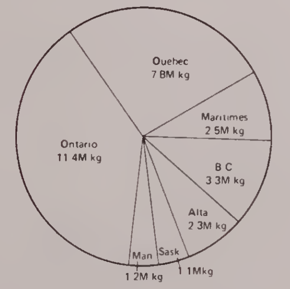
EXPORTS
$1.9 M



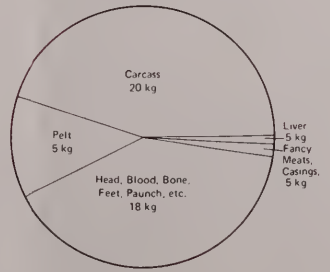
SHEEP ON FARMS, JULY 1, 1975
702.6T



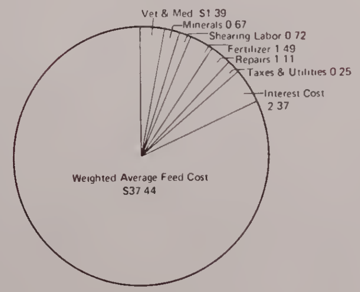
ESTIMATED PROVINCIAL MUTTON & LAMB CONSUMPTION, ADJUSTED TO REGIONAL INCOME LEVELS, TOTAL CONSUMPTION 29.6M kg



LAMB PRODUCTS, BY WEIGHT LIVEWEIGHT 44 kg



CASH & INTEREST COSTS PER LAMB WEANED $45.45



14. THE CANADIAN SHEEP AND LAMB SYSTEM

14.1 INTRODUCTION

There are recognized opportunities for sheep production and expandable markets for lamb in Canada. Yet, in Canada, the industry has declined markedly since 1950 (Table 14.1). In 1976, sheep and lambs on farms totalled 641,300 head compared with 1,579,000 head in 1950. Sheep numbers in North America are on the decline, but they are increasing in Great Britain, New Zealand and Australia.

In 1975, the sheep and lamb industry only contributed $13.4 million or 0.13 percent of total farm cash receipts (Table 14.1) and supplied a fraction (1.8 percent) of the total red meat consumed by Canadians. Imported lamb and mutton constitute over two-thirds of domestic consumption which, in 1975, amounted to 1.3 kilograms per capita (Table 14.2). In keeping with the declining sheep numbers, wool production also has declined, and in 1975 the production amounted to 1,398,455 kilograms (Table 14.3). Approximately 50 percent is exported (largely the fine wools), about 35 percent is taken for the felt mill trade in Canada and the remainder goes into various segments of the domestic woolens industry.

Sheep are suited to all the agricultural regions of Canada. Some variation in breeds is called for by particular management systems, e.g., range versus farm flock. Sheep have an inherent ability to utilize a wide range of grasses, crop residues and, to some extent, browse. This characteristic can make sheep economically important in 'common use' grazing with cattle to improve pasture utilization and weed and brush control, and in salvaging waste by-products of the grain industry with a minimum of processing. Sheep also have the potential to respond to intensive management, such as confinement or semi-confinement.

With the current emphasis on the production of market lamb rather than wool, traditional methods of lambing in the spring and selling lambs in the fall are changing. Early weaning of lambs, rearing in confinement and semi-confinement and year-round breeding are some of the modern management techniques available to progressive sheepmen.

Except for one specialty lamb abattoir in Alberta, the major markets for sheep and lambs are located in Eastern Canada. In 1975, only about 53 percent of the product was identified as being marketed through stockyards or direct to packers. It is assumed that the balance was sold direct from the farm, largely to ethnic buyers. These direct sales assume considerable importance for producers located around major metropolitan areas in Eastern Canada, especially in the pre-Easter period. In fact, the ethnic lamb market has a dominating influence on the sheep industry.

Table 14.1 FARM CASH RECEIPTS FROM SHEEP, CANADA, 1950 TO 1975

Year	Farm Cash Receipts	Receipts From Sheep and Lamb	Sheep & lambs as % of Farm Cash Receipts
	- $000 -		%
1950	2,135,784	13,902	0.65
1951	2,735,538	13,214	0.48
1952	2,803,665	10,884	0.38
1953	2,710,162	9,901	0.36
1954	2,295,135	9,574	0.41
1955	2,272,396	9,378	0.37
1956	2,534,304	9,679	0.38
1957	2,517,904	10,133	0.40
1958	2,814,357	10,665	0.37
1959	2,775,960	10,436	0.37
1960	2,811,702	10,021	0.35
1961	2,923,682	11,095	0.37
1962	3,182,249	10,482	0.32
1963	3,214,620	10,127	0.31
1964	3,504,123	9,857	0.28
1965	3,831,064	9,652	0.25
1966	4,313,560	8,600	0.19
1967	4,401,817	8,635	0.19
1968	4,377,380	8,347	0.19
1969	4,242,676	8,245	0.19
1970	4,250,850	7,876	0.18
1971	4,564,162	7,805	0.17
1972	5,451,185	8,991	0.16
1973	6,840,219	10,673	0.15
1974	8,878,700	12,867	0.14
1975	9,907,331	13,467	0.13

Source: Statistics Canada, Cat. 21-001.

Table 14.2 MUTTON AND LAMB INDUSTRY STATISTICS, CANADA, 1950 TO 1975

Year	Sheep & Lamb Population on Farms (June 1)	Production Mutton & Lamb	Exports Mutton & Lamb	Imports Mutton & Lamb	Domestic Disappearance Mutton & Lamb	Per-Capita Disappearance
	000 head		- 000 kg -			kg
1950	14,605	1,255		221	13,984	1.0
1951	12,082	1,244		1,590	12,456	0.9
1952	13,520	21		1,210	14.202	1.0
1953	13,504	24		2,157	15,891	1.1
1954	13,956	24		2,214	17,317	1.1
1955	14,721	124		4,907	18,483	1.2
1956	14,858	21		4,339	18,869	1.2
1957	15,082	215		5,007	19,699	1.2
1958	14,226	626		9,794	20,749	1.2
1959	14,447	341		9,123	23,377	1.3
1960	14,346	50		10,696	23,836	1.3
1961	15,706	79		15,197	29,323	1.6
1962	14,455	253		17,085	32,036	1.7
1963	14.340	309		21,753	34,261	1.8
1964	13,553	344		16,980	29,900	1.5
1965	11,405	168		13,772	25,492	1.3
1966	9,631	283		29,946	35,377	1.8
1967	9,566	87		17,626	38,727	1.9
1968	8,595	43		39,245	46,144	2.2
1969	7,788	314		41,751	47,996	2.3
1970	7,515	289		36,499	44,110	2.1
1971	8,268	42		23,984	32,297	1.5
1972	9,023	307		36,613	46,221	2.1
1973	9,951	71		26,550	37,281	1.7
1974	8258	57		17,453	25,844	1.1
1975	8,223	85		18,929	29,653	1.3

Source: Statistics Canada, Cat. 21-514.

Table 14.3 WOOL INDUSTRY STATISTICS, CANADA, 1950 TO 1975[a]

Year	Production	Imports	Exports	Domestic Disappearance
		- 000 kilograms -		
1950	3,706	36,762	1,967	38,500
1951	3,128	30,665	1,207	32,586
1952	3,448	21,526	1,654	23,319
1953	3,649	28,236	1,707	30,177
1954	3,555	18,511	1,302	20,766
1955	3,567	24,268	1,311	26,525
1956	3,578	26,018	1,634	27,962
1957	3,580	21,514	1,781	23,273
1958	3,357	19,186	1,819	20,724
1959	3,520	23,406	2,274	24,651
1960	3,526	22,501	1,672	24,355
1961	3,389	24,741	2,303	25,827
1962	3,295	24,686	1,800	26,175
1963	3,133	27,184	2,119	28,198
1964	2,895	28,116	1,465	29,546
1965	2,581	29,646	1,926	30,302
1966	2,163	28,144	1,373	28,934
1967	1,621	25,106	1,546	25,180
1968	1,472	27,495	1,355	27,613
1969	1,463	25,215	1,141	24,537
1970	1,486[b]	19,394	1,076	19,805
1971	1,757[b]	17,074	700	17,995
1972	1,567[b]	19,576	903	20,486
1973	1,460[b]	15,621	713	16,368
1974	1,452[b]	12,229	519	13,162
1975	1,399[b]	14,327	988	14,738

[a]All wool figures are on a greasy basis.
[b]Includes Newfoundland.

Source: Statistics Canada, Cat. 23-205, 65-202 & 65-203.

The ethnic market has not been researched extensively; however, preliminary indications suggest that within certain limits it can be expanded by improved marketing methods and promotion. It is estimated that the overall consumption of lamb could be doubled immediately with little effect on the consumption of other meats.

14.2 THE PRIMARY SECTOR

14.2.1 Resource Utilization

Feed resources required by the sheep industry are about 282,500 tonnes of hay or equivalent in feed or pasture. Sheep, being ruminants, compete with beef for feedstuffs and grazing land. Sheep and beef cattle are about equal as converters of feedstuffs to meat, though by increasing frequency of lambing and prolificacy, sheep can be more efficient. Sheep production is fully competitive with beef, in terms of initial investment and potential returns.

14.2.2 Industry Structure

The federal-provincial cost-sharing program which was set up in 1960 to provide transportation assistance to sheep producers has contributed slightly to increasing Canada's sheep population and average flock size.

Nonetheless, in 1976, the number of sheep on Canadian farms was about 641,300 head, a 25 percent decline over 1971 (Table 14.4). At the time of the last census, there were only slightly more sheep one year and over than lambs under one year old, and, except for the more intensive sector of the industry in the Prairie Provinces, the average flock size in the country was around 45 head per flock.

Sheep are often raised as an adjunt to another farm operation. For example, producers maximize returns to production by grazing sheep on grain stubble; some may use hog buildings in the off-season to raise feeder lambs, etc. It is known that production of meat per hectare can be enhanced when sheep are pastured along with beef cattle.

14.2.3 Regional Variations

Approximately 60 percent of Canadian sheep production is in the west (Table 14.5). Light lamb production is of greatest importance in the east, while heavy lamb production is most important in the west. In 1975, the meat equivalent of sheep and lambs produced on Canadian farms, including slaughter and live exports of animals of Canadian origin, was 7,305,909 kilograms representing 0.5 percent of the total Canadian meat production from cattle, hogs, sheep and lambs, or 0.7 percent of the production from ruminants.

Table 14.4 SHEEP INDUSTRY STRUCTURE, CANADA, 1971

	Atlantic	Que.	Ont.	Prairies	B.C.	Canada
			- 000	head -		
Sheep population	71.0	88.4	216.3	432.0	53.1	860.8
Farms reporting	1.6	2.1	4.4	4.9	1.11	14.[illegible]
Lambs under 1 year old	34.1	40.6	98.0	203.0	25.1	401.[illegible]
Sheep 1 year and over	36.8	47.8	118.2	228.9	28.0	459.7
Average flock size (head)	45.0	43.0	49.0	87.0	48.0	61.[illegible]

Source: Statistics Canada, Census of Agriculture, 1971.

Table 14.5 TOTAL PRODUCTION OF SHEEP AND LAMB BY PROVINCE, CANADA, 1975

	Atlantic	Que.	Ont.	Prairies	B.C.	Canada
			- 000	head -		
Total Production						423.5
- Feeder lambs	-	-	0.4	5.5	0.4	6.[illegible]
- Lambs sold for slaughter on stockyards or direct to plants	6.5	3,3	48.8	114.9	8.9	182.[illegible]
- Cull Stock sold on stockyards	1.2	1.5	15.0	14.4	1.7	33.8
- Sheep and lambs unaccounted for						201.[illegible]
- Wool production '000 lb	158.0	207.0	675.0	1817.0	194.0	3077.[illegible]
- Registered stock exported	*	-	0.3	*	*	0.4
- Registered stock imported						0.[illegible]

- Not available.
* Less than 100.

Source: Livestock Division, Agriculture Canada.

Alberta and Ontario are the two largest sheep producing provinces due to a combination of a number of factors, namely (1) the availability of reasonably priced feedstuffs and/or pasture, (2) proximity to markets and/or specialty abbattoirs, and (3) the availability of breeding and replacement stock. Saskatchewan, Quebec and British Columbia follow in order of production volume.

Feeding out lambs to market weight has not been an important part of the sheep industry in Canada. The small number of feeder lamb operations, based on lambs from Western Canada, has been centered mainly in Southern Ontario. With declining sheep numbers, it does not appear likely that this business will increase.

Wool production is of greater significance in the west than in the east. The fine wool of the western range sheep (Rambouillet) usually commands premium prices. With the exception of a few breeds such as the Lincoln and Cotswold, wool is largely a by-product of lamb production in the east.

14.2.4 Technology

Over the years, benefits from crossbreeding have improved growth performance and increased prolificacy and lamb survival in commercial sheep flocks in Canada. In 1975, total purebred registrations from 626 flocks numbered 7,190 head, of which the Suffolk, Dorset, Hampshire, N.C. Cheviot and Leicester breeds represented 51, 15, 8, 8 and 4 percent respectively. Introduction of the prolific Finnish Landrace breed of sheep to Canada has increased the immediate prospects for a significant improvement in ewe productivity.

The level of technology of the Canadian sheep industry is being increased generally. Rapid development of Record of Performance testing programs for flock testing on the farm and for station testing of rams will help to upgrade the industry's performance level. There are nonetheless variations in the kind of technology utilized on farms and it is expected that these will persist in conformity to regional differences in climate and soils and to preferences among producers.

Sheep production in the traditional sense can be intensified by semi-confinement of the sheep, allowing for feed production on the farm from heavier-yielding crops than those customarily grown for pasture. This also aids in reducing the problem of internal parasites.

Research is underway to develop technology for more intensive sheep production. Objectives include increased lamb growth and muscle content of the carcass and increased lambing frequency and litter size. Development of total confinement systems for lambs has long-range potential for maximizing flock and arable land productivity. In such a system, feed processing technology would be used to develop suitable rations from components grown on the most productive croplands for the sheep production units.

14.2.5 Primary Marketing and Pricing

The important markets for lamb are obviously the urban areas, especially those with large ethnic communities. Sheep compete with all meat and poultry in the marketplace. Lack of constant supply and relatively higher prices for Canadian lamb have caused it to become considered as a specialty item.

In broad terms, there are two ways of marketing sheep and lambs: (1) through stockyards and direct to packers, and (2) at the farm gate. In 1975, 222,593 of the 423,500 head produced in Canada were sold by the first method. The balance or 47 percent of total production is unaccounted for except in Statistics Canada's semi-annual survey of population and production.

The interest in lamb from the ethnic market is evidenced by the large number of ethnic buyers on the Ontario Stockyards. This group also buys most of the production sold at the farm gate (unaccounted for in the statistics); the balance undoubtedly goes into an increasing "locker trade" off the farm. Ethnic demand rises in the weeks before the Catholic and Orthodox Easters, declines but stays strong during the summer months for family get-togethers and rises again for Christmas.

Of the 222,593 head marketed through stockyards and packing plants in 1975, 82 percent were slaughter lambs, 15 percent were sheep and the remainder feeder lambs.

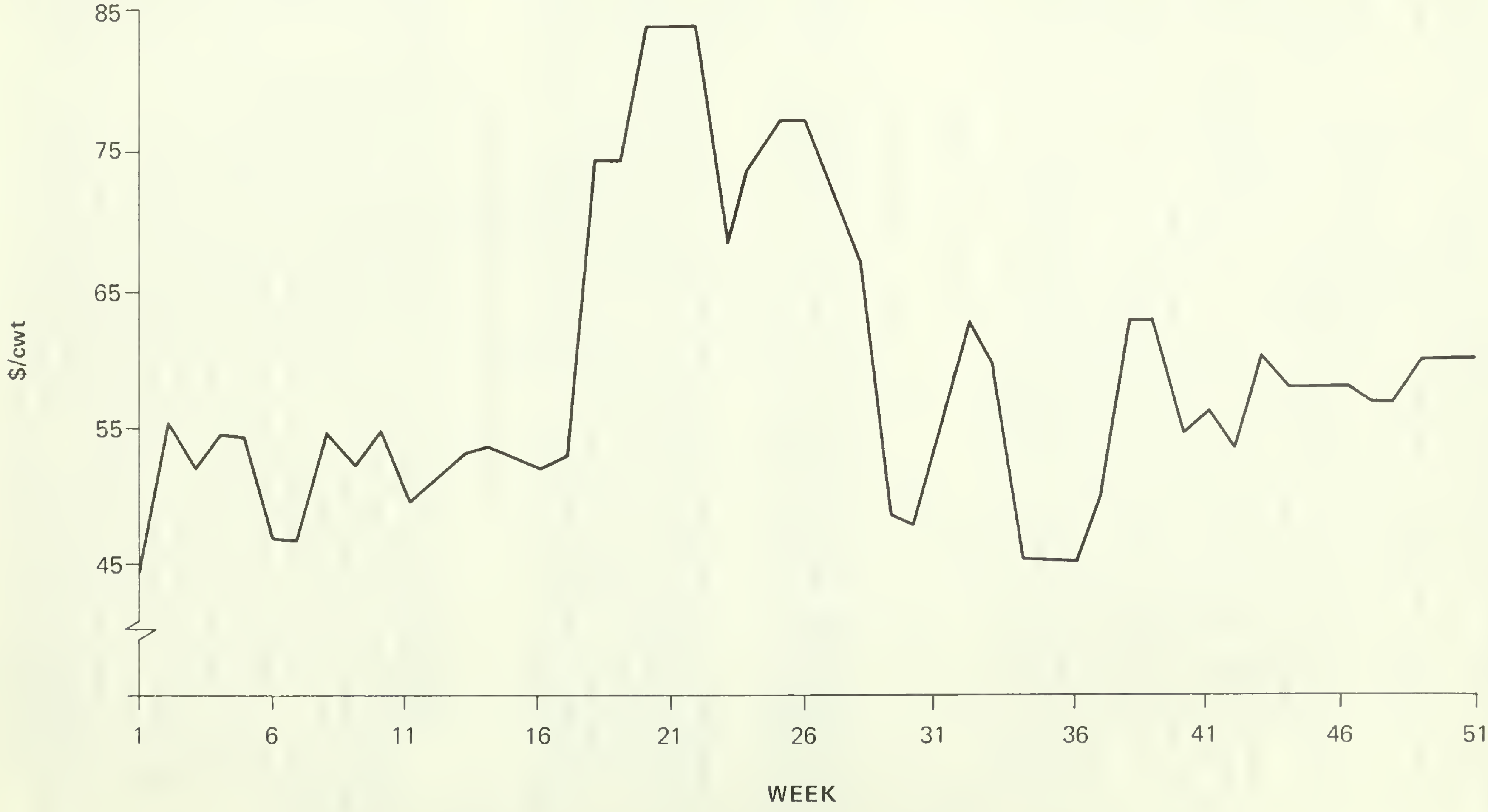
Toronto prices for lamb set the price for the balance of the country (Figure 14.1). In 1975, lambs marketed outside of regular marketing channels were selling at a minimum of $2.20 per kilogram liveweight and no less than $45 per head. By contrast, wholesale prices for frozen New Zealand lamb landed at Toronto in 1976 have been about $2.20 per kilogram. Retail prices vary by cut but have been about $2.84 to $3.72. This compares with fresh Canadian product retailing in the $4.40 to $6.60 range.

Although Quebec's sheep population is only one-third that of Ontario's, the Montreal market is large and obtains a considerable proportion of its supplies from the Ontario Stockyards in Toronto. Prices are lower in the west than in the east due to lesser demand and to the cost of transport to eastern markets. The extent of the difference varies greatly from time to time, because of price fluctuation.

Sheep and Wool Commissions

Sheep producer organizations exist in all the provinces. In British Columbia, Alberta and Saskatchewan, Sheep and Wool Commissions have been formed. The purpose of these Commissions,

FIGURE 14.1 **WEEKLY PRICES FOR GOOD LAMBS AT ONTARIO STOCKYARDS, 1975**



Source: Agriculture Canada, Livestock Market Review, 1975.

which are all similarly organized and are controlled by the respective provincial governments, is to promote and develop the sheep industry. As an example, in the Saskatchewan commission, the General Manager is a civil servant and the other six members are sheep producers who are appointed by the Minister. A check-off is collected on marketings of sheep and lamb (20 cents per head) and wool (one cent per pound). Producers are not required to market through the Commission but the check-off must be paid on all sheep, lambs and wool marketed, regardless. Monies collected are used to support the sheep industry in the marketing and promotion fields. In addition to marketing and promotion, the Sheep and Wool Commissions have a broader role. This includes coordination of association activities within the province and liaison with the government, dissemination of information on markets and on production techniques, and the organization of shows and field days.

Canada Sheep Marketing Council

In 1972, the federal government encouraged the formation of the Canada Sheep Marketing Council, a national producer organization with representation from all the provinces. Government financial assistance was authorized over a five-year period commencing with $250,000 in the first year and decreasing by $50,000 annually. Projects developed by the Council for the betterment of the sheep industry are submitted for government approval.

One of the important objectives of the Council is to develop a national body with representation from all the provinces, to continue the work of the present Council after March 31, 1978.

14.3 THE SECONDARY SECTOR

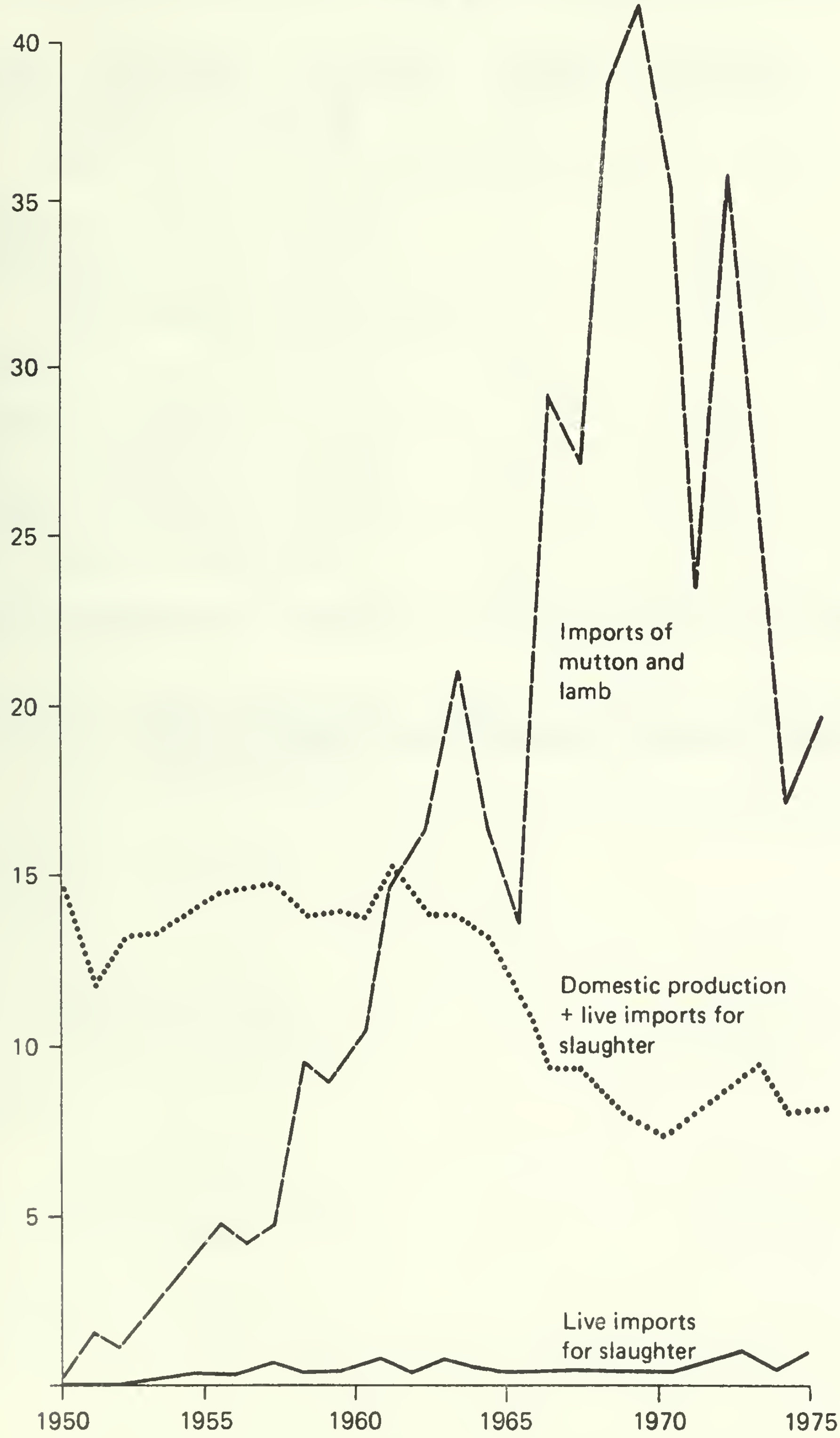
14.3.1 Industry Structure

Agriculture Canada statistics showed that 183,002 sheep and lambs were slaughtered in 74 federally inspected plants, and 104,332 sheep and lambs were slaughtered in 300 provincially inspected plants in 1975-76 (Table 14.6). Of the 139 plants for which volume of slaughter was specified, 78 percent processed less than 500 sheep and lambs during that period. The specialized lamb processing plant at Innisfail, Alberta, has a processing capacity of 3,750 head per week. However, the actual throughput of this plant, as of the others which also handle cattle and hogs, reflects the decline in sheep numbers that has occurred in Canada. Thus, a gap exists between production and the processing capacity of the plants as well as the market demand for lamb, two-thirds of which is met by imports (Figure 14.2).

Indeed, of the 29.6 million kilograms of dressed mutton and lamb that were consumed domestically in 1975, only 7.2 million kilograms were produced in Canada (Table 14.7). It is worth noting that a diminishing percentage of the slaughtering plants

FIGURE 14.2
DOMESTIC SLAUGHTER INCLUDING LIVE IMPORTS FOR SLAUGHTER VS. IMPORTS OF MUTTON AND LAMB, CANADA, 1950 to 1975

(1 unit = 1,000 tonnes)



Source: (1) Health of Animals Branch, Agriculture Canada.
(2) Statistics Canada, Cat. 65–202.

Table 14.6 NUMBER OF PROCESSING PLANTS BY PROVINCE AND VOLUME, AND NUMBER OF PLANTS INSPECTED, CANADA, 1975/76

Volume	Atlantic	Quebec	Ontario	Prairies	B.C.	Canada
Less than 500 head	13	20	20	59	6	108
500-2,000	3	4	1	2	3	13
2,000-5,000	1	2	1		1	5
Over 5,000		4	5	4		13
Volume not specified		235				235
	17	30	252	65	10	374
Federally inspected	11	10	17	32	4	74
Provincially inspected	6	20	235	33	6	300

Source: Health of Animals Branch, Agriculture Canada.

Table 14.7 MUTTON & LAMB PRODUCTION, TRADE & DOMESTIC DISAPPEARANCE, CANADA, 1975

	- 000 kilograms -	
Dressed Mutton and Lamb		
on hand January 1		3,097
From Canadian slaughter		8,223
Canadian produced	7,221	
Live imports, dressed equivalent	1,002	
Imports, Fresh or Frozen		20,292
Mutton (98.5% boneless)	8,458	
Lamb	8,599	
Not elsewhere specified	3,235	
Exports, Fresh or Frozen		85
On hand December 31		1,874
Domestic disappearance		29,653
Per-capita consumption		1.3

Source: Statistics Canada, Cat. 21-508, 65-202 & 65-203.

Table 14.8 WOOL PRODUCTION, TRADE & DOMESTIC DISAPPEARANCE, CANADA, 1975

	- 000 kilograms -	
Canadian Production		1,398,455
Imports		14,236,818
In the grease	154,874	
Scoured or washed	3,087,010	
Further processed	11,084,934	
Exports		987,727
In the grease	857,882	
Scoured or washed	10,600	
Further processed	119,246	
Domestic Disappearance		14,737,545

Source: Statistics Canada, Cat. 23-205, 65-202 & 65-203.

are subject to federal inspection. This may be another indication of the importance of the ethnic market which is possibly slaughtering its farm-gate purchases in a number of small plants (Figure 14.3).

There are no longer any wool combing facilities in Canada and all fine wools for worsteds have to be exported. The 1975 production of wool in Canada was 2,398,636 kilograms while imports totalled 14,326,818 kilograms, indicating that a significant level of activity has been established in the secondary sector (Table 14.8). In 1975, also, 423,000 skins were produced in Canada.

14.3.2 Secondary Marketing

The following products of the secondary sector are obtained from the processing of sheep and lamb (Figure 14.4):

- lamb and mutton, fresh, chilled or frozen;
- fancy meats (edible offal), fresh, chilled or frozen;
- cured meats;
- meat preparations and ready-cooked meat, not canned;
- meat and meat preparations (excl. infants foods), canned;
- feed ingredients of animal origin;
- crude materials, inedible;
- fabricated materials, inedible;
- end products, inedible.

Limited market volume has impeded product development and merchandising of lamb. Investigation and experience have shown a general lack of awareness of lamb on the part of both the retailer and the shopping public. This can be illustrated by comparing elasticities of demand for various meat commodities (Table 14.9).

Since 1950, domestic disappearance of mutton and lamb has fluctuated much, reaching a high of 47.7 million kilograms in 1969. It has declined approximately 40 percent since then (Figure 14.5). In 1975, Canadian per-capita disappearance of mutton and lamb was only 1.3 kilogram or one kilogram less than the per-capita disappearance of all offal (i.e., for cattle, sheep and swine) in Canada.

There is a strong consumer demand in Canada for lamb as a specialty or delicacy meat. It has been demonstrated in Alberta that lamb consumption can be increased significantly by increasing the consumer's and particularly the retailer's knowledge of lamb. The ability of Canadian producers to respond will determine the percentage of this market that will be captured by the domestic product. There may be potential benefit in cooperating with New Zealand, Australia and the United States on promotion and import quotas in order to maintain a continuous supply of high-quality lamb on meat counters. Tariff protection and support prices for lamb and wool can help to stabilize farm production, but under the

FIGURE 14.3 FEDERALLY INSPECTED SLAUGHTER AS A PERCENTAGE OF TOTAL SHEEP AND LAMB SLAUGHTER, CANADA, 1950 to 1975

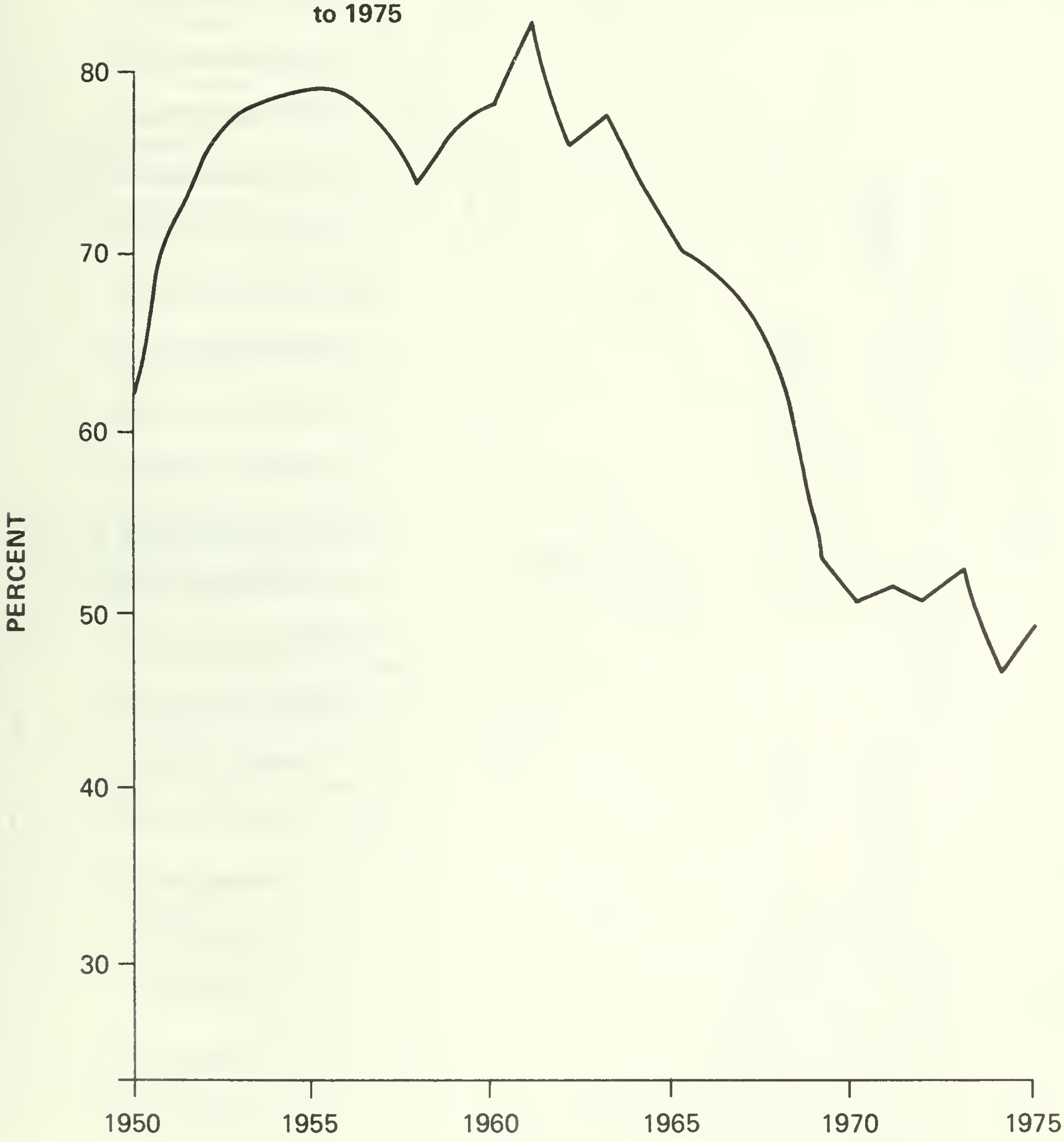
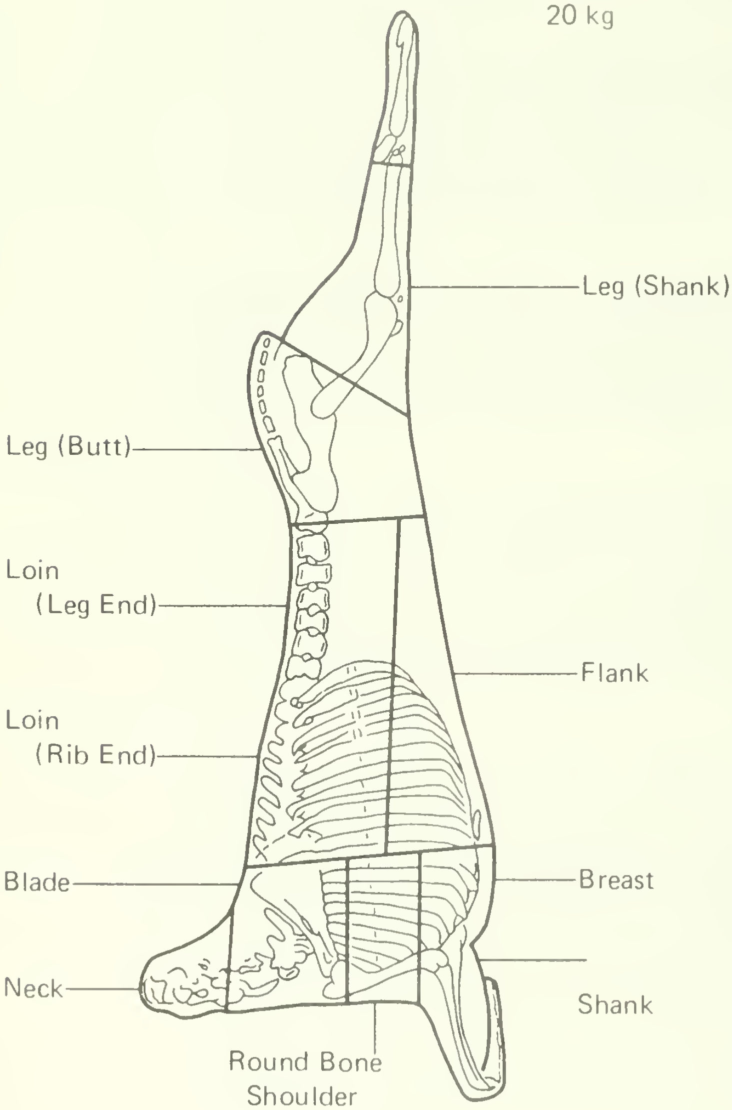


FIGURE 14.4 LAMB UTILIZATION CHART, CANADA, 1976

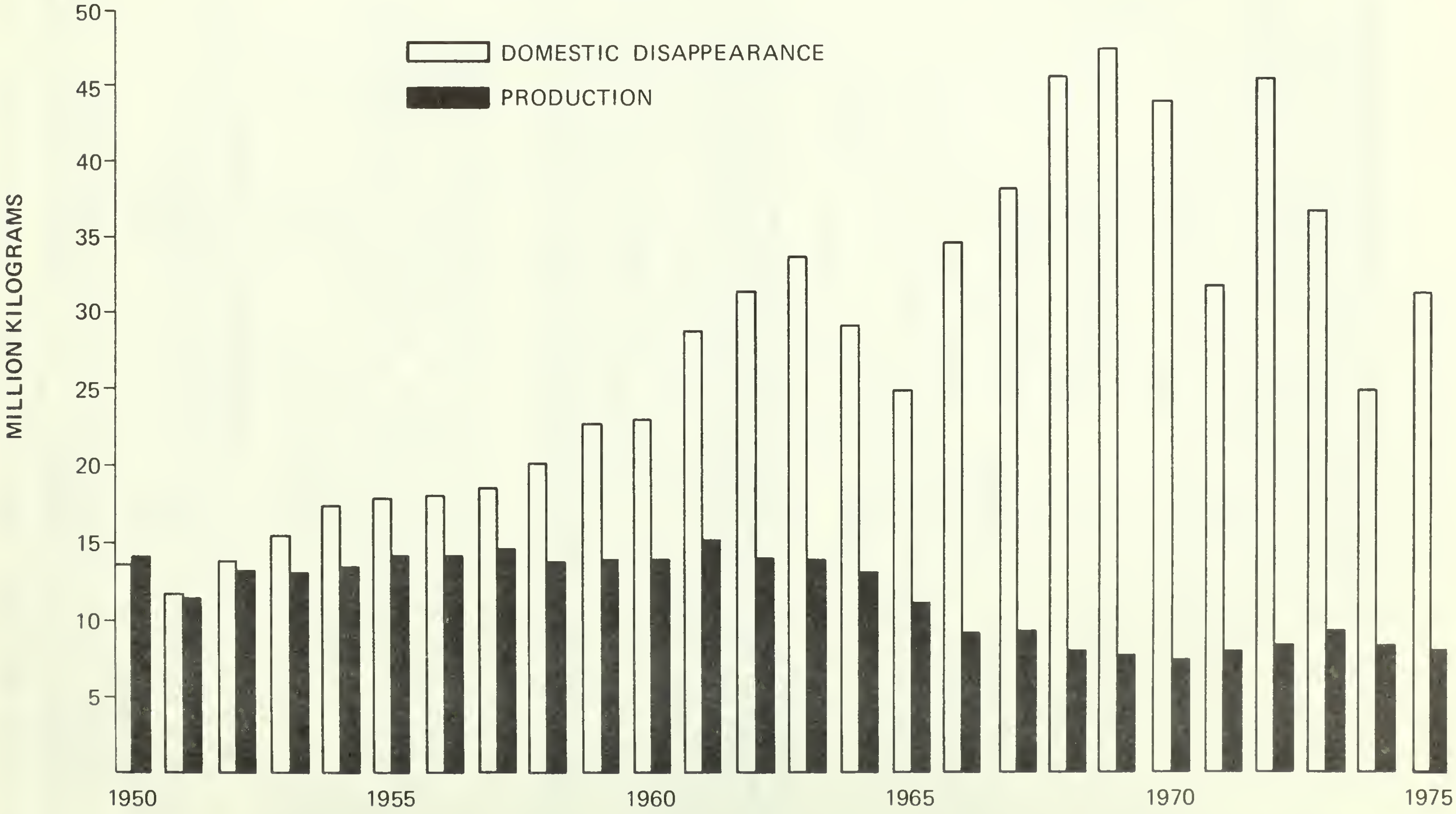
By–Products	24 kg
Pelt	5 kg
Liver	50 cg
Casings	9 cg
Kidney	7 cg
Heart	11 cg
Tongue	11 cg
Lamb Fries (Testicles) each	11 cg
Head, Blood, Bone, Feet, Paunch, etc.	18 kg



Estimated Weight for Primal and Fabricated Lamb Cuts

Foresaddle	10 kg
Bracelet (Double)	3 kg
Hotel Rack	2 kg
Front & Plate (Double)	8 kg
Front (Double)	7 kg
Shoulder (Double)	5 kg
Breast & Shank	3 kg
Hindsaddle	10 kg
Loin Regular (Double)	3 kg
Loin Trimmed (Double)	1 kg
Legs (Double)	5 kg
Leg, Partially Boneless	2 kg
Back, Regular	4 kg
Back, Trimmed	3 kg
Hindsaddle Long–Cut Regular	9 kg
Hindsaddle Long–Cut Trimmed	8 kg

FIGURE 14.5 **MUTTON & LAMB PRODUCTION & DOMESTIC DISAPPEARANCE, CANADA, 1950 to 1975**



Source: Statistics Canada, Cat. 32–220.

Table 14.9 ELASTICITIES OF DEMAND FOR LAMB, BEEF AND PORK, CANADA, 1976

Commodity	Direct Price Elasticity[a]	Income Elasticity[a]	Expenditure Proportion[b]
Lamb	-1.966	.676	.0008
Beef	-0.852	.506	.0374
Pork	-0.955	.132	.0249

Gross effects of price on consumption[c]

	Lamb	Beef	Pork	Veal	Chicken	Turkey
Lamb		.4060	.4650	.0140	.0094	.0047
Beef	.0093					
Pork	.0162					
Veal	.0078					
Chicken	.0015					
Turkey	.0016					

[a]Expected percentage change in demand for a one percent increase in price and a one percent increase in income respectively.

[b]Proportion of total family expenditure.

[c]With a ten percent increase in the price of lamb, there is an estimated increase of 4.1 percent in beef consumption and an increase of 4.6 percent in pork consumption. On the other hand, with increases of ten percent in the prices of beef and pork, the consumption of lamb increases by only .09 - .16 percent.

Source: Agriculture Canada, Pub. 76/2.

Table 14.10 LIVE SHEEP IMPORTS & EXPORTS, CANADA, 1975

Imports	U.S.A.	U.K.	New Zealand	Other	Total
Live Sheep and Lambs	4,511	1,480	2	-	5,993
Live Lambs for Slaughter	51,608	-	-	-	51,608
Total Live Imports	56,119	1,480	2	-	57,601
Exports					
Live Sheep and Lambs	3,633	-	-	742	4,375

Source: Statistics Canada, Cat. 65-202 & 65-203.

present circumstances wherein substantial imports of both these commodities are required, increased tariff protection does not seem to be the answer to the industry's most immediate problems.

With reference to wool, 1975 domestic production and disappearance had more than halved as compared to 1950 (Figure 14.6), with production representing only nine percent of domestic disappearance.

14.3.3 International Trade

Canada has been a net importer of mutton and lamb since 1951; in 1975, net imports totalled 18.9 million kilograms or less than half of the record high of 1969 (Table 14.1). Meats and meat-food products from sheep for which export certificates were issued in the year 1975-76 included boneless lamb and mutton, carcasses, quarters, halves, cuts, lamb livers and sheep casings.

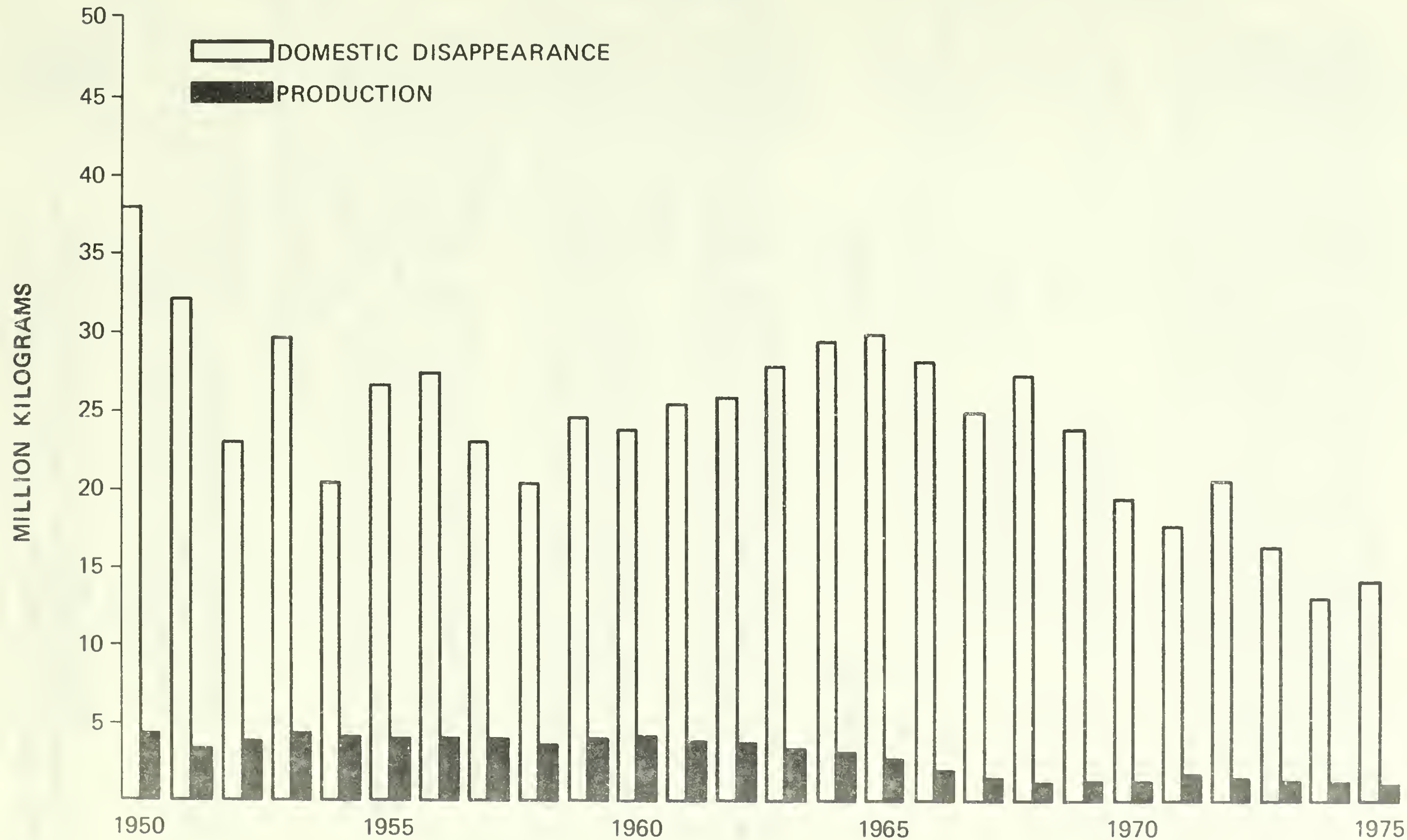
Canada is also in a net import position for live sheep; in 1974, these stood at 29,803 (Table 14.10). Canada's trade balance in wool has remained negative throughout the period 1950-75 (Figure 14.7); in 1975, net imports of wool were 13.3 million kilograms.

In 1975, the sheep population in most countries increased slightly over that of 1974, when it numbered about one billion. The world flock is roughly distributed among regions as follows:

	Percent		Percent
Asia	27	EEC	4
Australia	21	Eastern Europe	4
USSR	14	Western Europe excl. the EEC	3
Africa	14		
South America	11	North and Central America	2

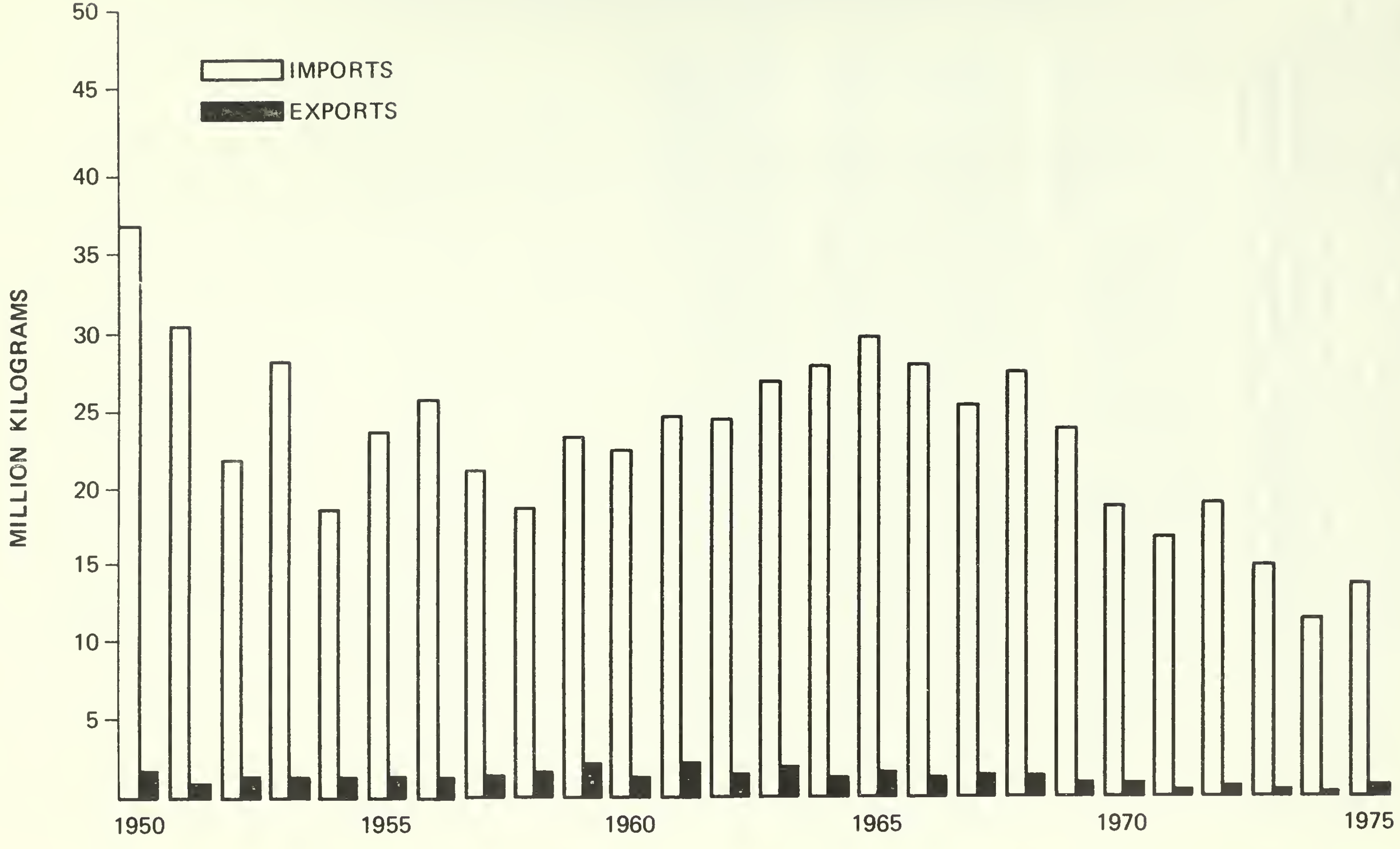
New Zealand and Australia are the major exporters of mutton and lamb. The major importers are the United Kingdom, Japan, France, and to a lesser extent Canada, the United States and Greece. Australia is developing new markets for live sheep and lambs in the Middle East; however, Japan remains her major market for mutton. Recent E.E.C. restrictions on lamb and mutton imports have forced New Zealand, and to some extent Australia, to shift more attention to North American markets.

FIGURE 14.6 **WOOL PRODUCTION & DOMESTIC DISAPPEARANCE, CANADA, 1950 to 1975**



Source: Statistics Canada, Cat. 23–205.

FIGURE 14.7 **WOOL EXPORTS & IMPORTS, CANADA, 1950 to 1975**



Source: Statistics Canada, Cat. 65–202 & 65–203.

World production of wool, greasy basis, declined steadily from 2.9 billion kilograms in 1968 to a low of 2.5 billion kilograms in 1973. Concurrent with this decline was a rise in the use of man-made fibers as wool substitues. World production recovered to 2.6 billion kilograms in 1974 and remained stable in 1975. The decline in production to 1973 reflected the decreased demand associated with the textile industries' increasing energy costs and affected all sectors of the wool industry.

HIGHLIGHTS OF THE CANADIAN GOAT SYSTEM

1975

1. Goats are kept chiefly for milk production, the buck kids being sold for meat. A good doe will give 6 to 8 litres of milk per day.

2. Goats are raised in all the provinces. They can be kept with little expense and utilize high fibre diets efficiently. Marginal or rough lands unsuitable for other types of livestock may be used, and an inexpensive type shelter will suffice, hence goats are well suited to small holdings.

3. In parts of Canada where fresh cow's milk is difficult to obtain, the milk goat may be an economical source of nutritious milk. In addition, it may provide sufficient cheese and butter for family use.

4. Goat's milk is utilized as a specialty product and recommended for certain infants and invalids, for which cow's milk is unsuitable.

5. Feeds suitable for dairy cows are, in general, suitable for milking goats except that goats prefer course ground or whole grains. Rough (or improved) pasture is used to advantage, and good use is made of an opportunity to brouse shrubs.

HIGHLIGHTS OF THE CANADIAN RABBIT SYSTEM

1975

1. Rabbits are produced mainly for meat which is nutritious, palatable, and has a low fat content. Rabbit skins are used in the manufacture of fur pieces, felt hats and handicraft items. Rabbits are also bred for use in laboratory work.

2. Rabbits are raised in all parts of Canada, in units ranging from one or two hutches to commercial rabbitries producing several hundred animals a week. They adapt well to production under domestic conditions. The New Zealand White and the Californian are the breeds most commonly raised for meat in Canada.

3. Commercial rabbit raisers in Canada aim for four or five litters per doe annually. Litters average six to eight youngs and most does can look after this number without difficulty. Under proper management, young rabbits from good commercial stock reach fryer weight of 1.8 to 2.3 kilograms (about 1 kilogram dressed at eight to ten weeks of age.

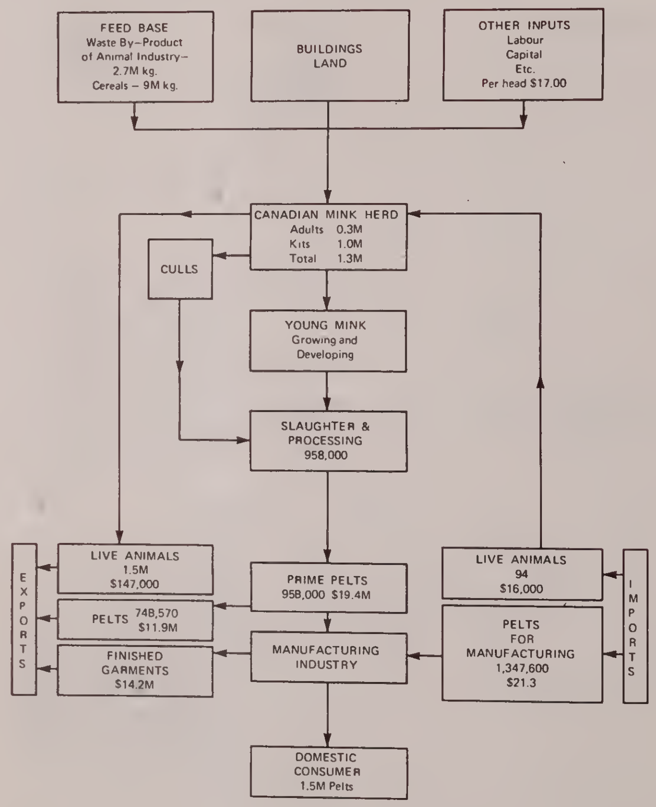
4. Most commercial rabbitries feed commercial pellets, which meet all the nutritional requirements of the rabbit. The higher cost of this ration, compared with the use of greens and root crops, is offset by faster gains, more convenience and less labour. Rabbits can utilize a high proportion of forages in the diet and have this advantage over chickens.

5. There is a specialty market for rabbit meat in large cities such as Montreal and Toronto where large ethnic populations are located.

6. Commercial rabbit producers must give careful thought to the subject of marketing before completing their plans. For a successful operation, a reliable year-round market is a must.

THE CANADIAN MINK SYSTEM

1975



M Million
T Thousand

1. In 1975, 958,000 ranched mink accounted for $19.4 million which was 99 percent of the value of all fur pelts produced on farms.

2. Production is regionally oriented, the principal producers, in order of importance, are Ontario, British Columbia, Nova Scotia and Quebec.

3. Over 200 types (colours) of mink, including variations of basic shades, have been produced. Colour mutations have had an extremely important impact on the mink industry. The Jet Black mink, one of the most important, originated in Nova Scotia in 1960 and is found wherever mink are raised.

4. The 1975 Canadian output of 958,000 mink pelts, plus maintenance of the breeding herd, required approximately 36 thousand tonnes of feedstuffs; 75 percent is fish and meat and poultry by–products, and 25 percent is commercial cereals. The bulk of the fish, meat and poultry used are not approved for human consumption, and use of these products by the mink industry represents salvage and "value added" of important proteins.

5. The full cycle of mink production, breeding, reproduction, growth and development of the young and pelting occurs within one year, thus the industry can expand or contract quickly.

6. The bulk of the Canadian crop of ranched mink pelts is sold at auction through competitive bidding, in fur auctions located in Montreal, Winnipeg and Vancouver. Other auction firms which handle only furs from the wilds are located in North Bay, Ontario and Regina.

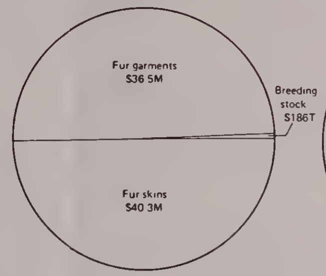
7. Canada has a significant export market of high quality ranched mink pelts amounting to $12 million in 1975. These rank in quality with the best in the world.

8. Canada also has a substantial fur manufacturing industry located mainly in Montreal which utilizes substantial numbers of domestic and imported mink pelts which are transformed into finished garments and exported ($14.2 million).

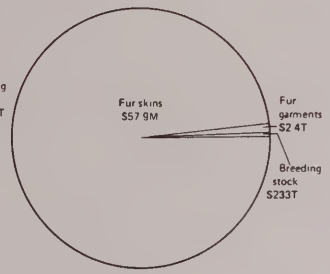
9. The industry would benefit substantially from research in the areas of development of dry diets, physiology of reproduction and better control of diseases. This knowledge would reduce costs of production and ensure the industry is competitive.

10. A continuing demand for products made from mink can be expected. The demand for fox is highly viable. It is unlikely that chinchilla will ever develop into a significant sector.

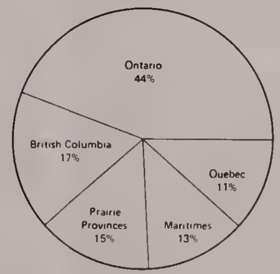
EXPORTS – ALL FURS
$262.8M



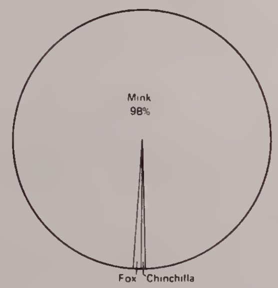
IMPORTS – ALL FURS
$293.3



REGIONAL PRODUCTION – MINK

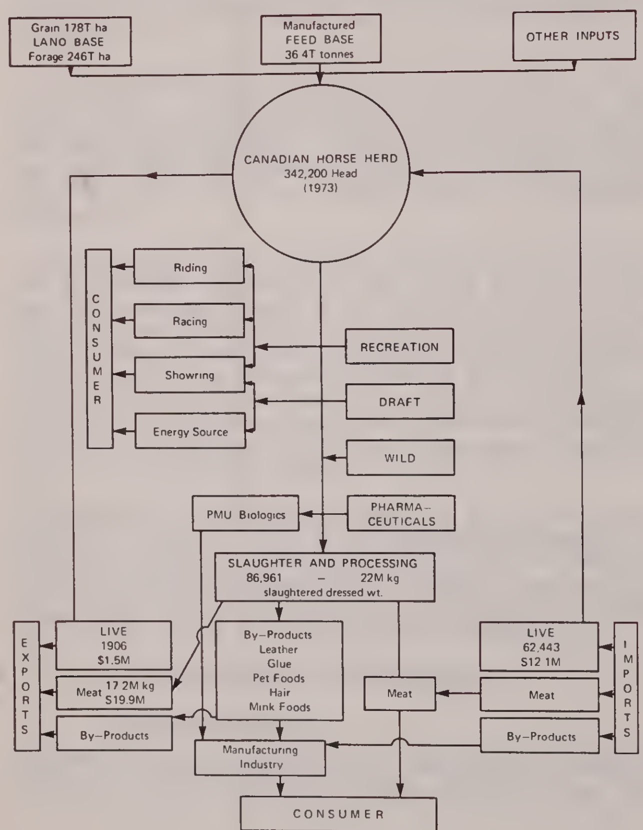


PROPORTION OF FURS FROM DIFFERENT FURBEARERS



THE CANADIAN HORSE SYSTEM

1975



M Million
T Thousand

1. There are about 354,000 horses (1971 census) in Canada used for recreation, draft, meat, leather and pharmaceutical production. While horse numbers generally declined 1950 to 1971, in recent years numbers of light horses have been increasing rapidly in areas of heaviest horse concentration. Recent official census figures for recreational animals are not available.

2. The majority of horses are light animals used for recreation and are located in urban fringe areas. The main concentrations are in Alberta, Ontario and Quebec.

3. Draft horses (heavy types) have been largely replaced by tractors and have declined dramatically in numbers since 1950. Limited numbers are still utilized in farming, lumbering and bred for the show ring.

4. Meat production from horses has increased steadily from 1971 to 1975. The largest numbers of horses are slaughtered in Quebec and Montreal is the largest market for horse meat in Canada. Per capita consumption by Canadians is about 1 kilogram.

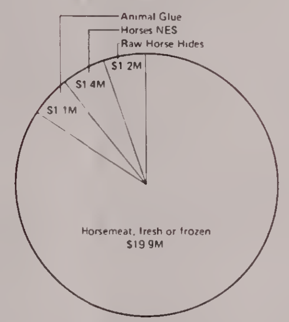
5. Parimutuel (racetrack betting) activity is rapidly increasing. Wagers increased from 564 million dollars in 1971 to over 1 billion dollars in 1975. Purses also doubled, 30 to 59 million dollars, over the same period. Numbers of horse shows and exhibitions are also increasing.

6. Production of pregnant mare urine (PMU) for the manufacture of pharmaceuticals (hormones) is a small but significant part of the industry.

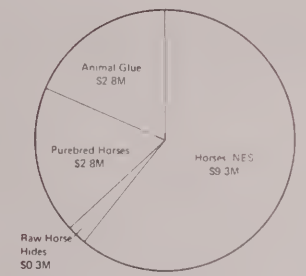
7. The primary feed requirement is forage with some feed grain and protein–mineral–vitamin supplements. Formulated horse feeds are becoming significant to the feed manufacturing industry in Ontario, Quebec and Alberta.

8. The future outlook is for increasing horse population for recreation and for meat. Demand for draft use may also increase as fossil fuels become scarcer and more expensive. There is potential for increasing horse production in remote Northern areas as they are extremely winter hardy.

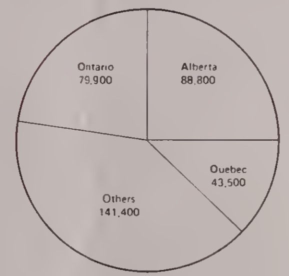
EXPORTS BY COMMODITY
$23 6M



IMPORTS BY COMMODITY
$15 3M



HORSE POPULATION DISTRIBUTION (1971)
353,600



FEDERALLY INSPECTED SLAUGHTER 1975/76
86,961

15. OTHER LIVESTOCK

15.1 FURBEARERS

15.1.1 Introduction

Since the earliest days, furs have played an important part in the economy of Canada. Though the relative importance of fur trapping has declined, it still makes a substantial contribution, especially to the economy of the Yukon and Northwest Territories. Indeed, in the period 1971-75, the average annual production of wild mink alone was 74,881 pelts valued at $1,113,341.

The other species that are hunted include wild mink, beaver, seal, muskrat, racoon, wolf, lynx, marten and fisher. Despite a long period of intensive trapping, the numbers of furbearers have been well maintained. Conservation has been encouraged by the establishment of wild-life preserves and parks, among other measures instituted by the federal, provincial and territorial governments.

Fur farming originated in Eastern Canada in the early 1900's and is presently the most important way of producing pelts. Mink is the largest branch of fur farming, currently accounting for 98 percent of the value of pelts produced on Canadian farms. Although some breeding animals are sold domestically and for export, the principal product of a mink farm is a mink pelt. The silverblue or platinum mutation, which developed in 1936 from the wild dark-brown mink, supplied an enourmous fillip to the industry in allowing a wide range of attractive natural colours to be produced.

Fox and chinchillas are also raised on a small scale on farms across the country. In 1975, fox production amounted to 1,923 pelts with a value of $349,505 (average $181.75). Statistics Canada discontinued publication of chinchilla statistics in 1969, but current annual production is estimated to approximate 22,000 pelts valued at around $308,000 (average $14).

15.1.2 The Primary Sector - Mink Ranching

Industry Structure

Mink are raised successfully in all the provinces except Newfoundland. Since the beginning of the industry in the 1920's, Ontario has been the major producing province (Table 15.1). The slightly higher cost of feedstuffs and (to an extent) labour in that province, compared with British Columbia and the Maritime Provinces, has been offset by the evidenced ability of Ontario mink ranchers to produce pelts of superior quality. Since 1951, the number of farms has steadily declined to 433 in 1975; however, during that same period, the breeding herd peaked (1967) only to fall to near 1950 levels again (Figure 15.1).

Production

Over 200 types (colours) of mink, including variations of basic shades, have been produced. One of the most important colour mutation, the Jet Black mink, originated in Nova Scotia in 1960 and is now found wherever mink is raised in Canada.

The full cycle of mink production, breeding, reproduction, growth and development of the young and pelting, occurs within one year, thus allowing the industry to expand or contract rapidly.

The 1975 output of approximately one million pelts (Table 15.2) and breeding animals plus maintenance of the breeding herd required approximately 36 million kilograms of feedstuffs, as follows:

Fish and fish by-products	40%
Packing house by-products including chicken	35%
Commercial cereals	25%
	100%

The fish and meat portion of the ration consists of chicken waste, coarse fish and fish racks after filleting, beef tripe, lungs, etc. The bulk of these items are not approved for human consumption, and usage by the mink industry represents the salvage of high protein feeds which would otherwise be wasted.

In some seasons, competition for these waste products is provided by the pet foods industry; however, as mink ranchers are spread thinly across the country, they are usually able to obtain their requirements through the smaller country abattoirs.

A break-through on feedstuffs appears imminent with the advent of 'dry' feeds which can be fed through the use of hoppers, filled twice a week or so. Use of these pelleted feeds will free mink ranchers from the daily feed hauling and preparation chore, do away with the need for expensive refrigeration facilities, and eliminate many feed-related disorders.

Table 15.1 MINK INDUSTRY STRUCTURE BY PROVINCE, CANADA, 1975

	Production		Population			Farms Reporting by Herd Size			
	Mink Pelts	Breeding Stock	Adults	Kits	Total	1-99	100-499	500-	Total
	- 000 -		- 000 -						
Maritimes	127.1	0.9	49.6	134.8	188.4	17	23	30	70
Quebec	104.2	2.2	36.4	106.4	142.8	1	15	24	40
Ontario	418.3	5.2	143.8	423.5	567.3	14	58	96	168
Prairie Provinces	146.2	0.8	53.2	147.0	200.2	16	45	30	91
British Columbia	162.3	5.6	61.9	167.9	229.8	3	12	50	63
Totals	958.0	14.7	344.9	979.6	1324.5	51	153	230	434

Source: Census of Agriculture Division, Statistics Canada.

Table 15.2 MINK RANCHING INDUSTRY STATISTICS, CANADA, 1951 TO 1975

Year	Pelt Production	Average Value	Number of Farms	Pelt Exports	Pelt Imports
	000	$		000	000
1951	619	17.57	2,557	643	93
1952	666	15.07	2,324	893	110
1953	622	16.22	2,089	983	145
1954	677	19.01	1,894	807	159
1955	787	20.07	1,858	679	150
1956	1,002	15.38	1,912	791	210
1957	936	16.39	1,899	991	365
1958	983	16.25	1,752	712	393
1959	1,054	17.74	1,724	728	419
1960	1,204	14.03	1,661	646	314
1961	1,271	14.50	1,616	906	491
1962	1,296	15.13	1,567	906	494
1963	1,400	15.82	1,505	1,058	670
1964	1,416	14.92	1,476	969	670
1965	1,624	17.41	1,484	1,020	624
1966	1,811	12.41	1,472	1,075	732
1967	1,967	11.58	1,469	1,351	932
1968	1,668	13.60	1,359	1,310	806
1969	1,779	10.48	1,147	976	704
1970	1,499	9.65	1,017	1,151	957
1971	1,157	12.67	837	858	1,052
1972	1,046	16.01	673	741	958
1973	1,066	18.00	614	697	922
1974	1,113	14.76	529	585	1,283
1975	958	20.27	433	695	1,348

Sources: (1) Statistics Canada, Census of Agriculture, 1951 to 1975.
(2) Statistics Canada, Cat. 65-202 and 65-203.

FIGURE 15.1 MINK INDUSTRY STRUCTURE AND PRODUCTION CANADA, 1951 to 1975

Source Statistics Canada

Because mink are confined in cages within open sheds on a year-round basis, large numbers of mink can be raised in comparatively small areas. Also, very little land is needed for feed production because mink are raised principally as by-products of other industries. The average mink ranch is, therefore, long on buildings and short on land. This is offset to some extent by the zoning regulations which apply in many areas and which require that all ranch buildings be situated certain minimum distances from property limits.

Since around 1960, increasing production costs and the trend towards larger operations has encouraged the use of labour-saving machinery such as powered feed carts and larger and more efficient machinery in the feed house. This has made possible a more efficient use of the labour force. In 1975, a maximum investment of $17,00 per pelt produced was required. (Table 15.3.

Table 15.3 RESOURCE UTILIZATION PER MINK PELT PRODUCED, CANADA, SELECTED YEARS, 1951 TO 1975

	1951	1956	1961	1966	1971	1975
			- dollars -			
Purchased Inputs	4.00	4.40	4.80	5.20	6.50	7.50
Labour	2.00	2.50	3.00	3.50	3.75	5.25
Capital	2.00	2.25	2.50	3.00	3.50	4.25
Totals	8.00	9.15	10.30	11.70	13.75	17.00

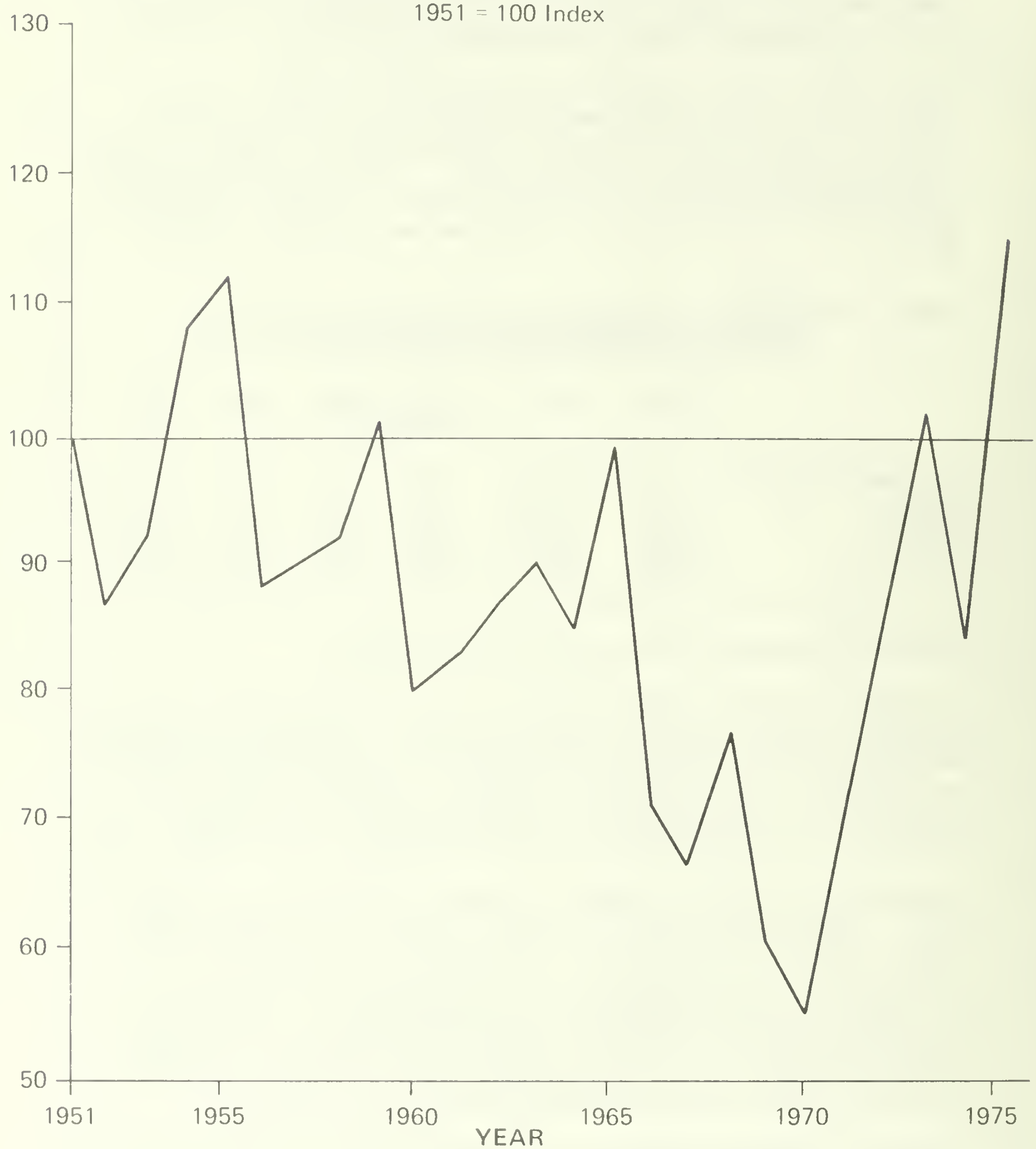
Source: Livestock Division, Agriculture Canada

Following a lengthy period when mink pelt prices left little or no return after production costs were met, the market advanced sharply in the 1975 marketing season. This upturn resulted in an increase of approximately 37 percent compared with 1974 prices. It is estimated that 958,000 pelts of an average value of $20.27 each were produced in 1975 (Figure 15.2).

Canada is the seventh largest producer of mink pelts in the world. With four percent of total production, Canadian mink farmers share with producers in the United States the distinction of producing the world's top-quality ranched mink. By comparison, mink produced in the Scandinavian countries is slightly inferior in quality, although the gap is narrowing. Mink from the U.S.S.R., the largest world producer, is inferior to both the North American and Scandinavian products.

Exports of breeding stock vary considerably from year to year; in 1975, some 1.5 million animals valued at $147,000 were shipped out of the country mainly to the U.S.S.R.

FIGURE 15.2 MINK PELT PRICE, CANADA, 1951 to 1975
1951 = 100 Index



Source: Statistics Canada

Technology

The level of technology in mink production has improved by only a limited extent over the past 25 years, but there is potential for vast improvement.

Seriously lacking in present production technology are better diets which will reduce feed costs, labour and feed-related disorders. Pathological diseases cause various losses and require research. The physiology of reproduction is an area with great potential but with little research knowledge to date.

15.1.3 The Secondary Sector

Mink Pelts

Initial processing is done on the farm where the animals are slaughtered and pelted. The bulk of the Canadian ranched mink production is then sold at auction through competitive bidding, by buyers who may be purchasing on their own account or on behalf of clients in other countries. The pelts are sold in the raw state to facilitate their export to other countries which maintain tariff duties on imports of processed pelts. Prices are established on an international basis through auction offerings in world fur centres such as Montreal, London, New York, Copenhagen and Leningrad. Domestic disappearance of mink pelts (including those made up in garments sold for export) has increased more than tenfold since 1951; it stood at 1.5 million in 1975.

Through the years, the United States has remained the most important market for Canadian mink pelts, with important quantities going also to the United Kingdom, France, Germany and Italy. There were 748,570 raw and dressed pelts (ranched and wild) exported from Canada in 1975; these were valued at $12 million or half the value of imports into the country (Figure 15.3).

Manufactured Products

The Canadian fur manufacturing industry is mainly centred in Eastern Canada, with approximately 70 percent of the production taking place in Montreal, 25 percent in Toronto and the balance in Western Canada (Table 15.4). Up to the mid-1960's, the industry was largely concerned with supplying the domestic market; this effectively limited the growth of the industry.

FIGURE 15.3 RAW AND DRESSED MINK PELT TRADE, CANADA, 1951 to 1975
1951 = 100 index

Source: Statistics Canada, Cat. 65–202 & 65–203.

Table 15.4 MINK SECONDARY INDUSTRY STRUCTURE, CANADA, SELECTED YEARS, 1951 TO 1975

		1951	1956	1961	1966	1971	1975
	Fur Auction Firms	-	-	-	-	-	-
Maritimes	Fur Processors	-	-	-	-	-	-
	Fur Manufacturers	-	-	-	-	-	-
	Fur Auction Firms	2	2	2	2	1	1
Quebec	Fur Processors	12	10	10	9	9	9
	Fur Manufacturers	285	280	270	250	250	246
	Fur Auction Firms	-	1	1	1	1	1
Ontario	Fur Processors	2	2	2	1	1	1
	Fur Manufacturers	110	110	105	100	100	98
	Fur Auction Firms	4	4	4	3	2	2
Prairies	Fur Processors	1	1	2	2	2	2
	Fur Manufacturers	20	20	18	14	12	12
	Fur Auction Firms	1	1	1	1	1	1
B.C.	Fur Processors	-	-	-	-	-	-
	Fur Manufacturers	-	-	-	-	-	-
	Fur Auction Firms	7	8	8	7	5	5
Canada	Fur Processors	15	13	15	13	13	13
	Fur Manufacturers	415	410	393	364	362	356

Source: Census of Agriculture Division, Statistics Canada.

International Marketing and Trade

Since 1965, fur manufacturers have become interested in exploring opportunities in the export field, and in the past ten years these endeavours have met with considerable success in Switzerland, Germany, Italy, the United Kingdom, and Japan (Table 15.5).

Table 15.5 MANUFACTURED FUR EXPORTS, CANADA, 1970 TO 1975

	Mink[a]	Total
1970	-	$19,443,000
1971	-	17,438,000
1972	-	20,244,000
1973	-	29,657,000
1974	$11,812	34,888,000
1975	14,156	36,527,000

[a]Not segregated out before 1974
Source: Statistics Canada, Cat. 65-202

Approximately one-third of the value of these exports consists of mink garments, the balance being made up of other fur types.

One result of the substantially increased exports of manufactured furs has been the need by manufacturers for additional quantities of raw furs. This has meant that the domestic trade is competing more keenly in Canadian Fur auctions. It has also meant that fewer Canadian mink pelts are available for export, and it is further reflected in the large increase in imports of foreign mink (for manufacture) in recent years (Figure 15.3).

The future of exports in the fur manufacturing industry appears bright. Limiting factors are the steadily increasing production costs and the need for a high degree of efficiency in design and finish, to compete in the face of tariff duties in the importing countries. Raw (undressed) mink pelts, which constitute the bulk of Canada's mink exports may be imported free of duty into most of the important fur consuming countries. Rates of duty ranging from 10 to 20 percent on imports of dressed pelts apply in these countries. The tariff duty faced by fur manufacturers for made-up fur pieces ranges from 20 to 25 percent ad valorem in most of the countries with which Canada is currently doing business.

From the beginnings of the industry up to approximately 1967, world production of ranched mink was on the increase. Commencing in 1967, the large quantities of pelts available proved to be more than the market could handle, and prices declined below the cost of production (Figure 15.2). In all countries except the U.S.S.R., there was a retrenchment in the industry and a sharp decline in production. The stronger market in 1975 has, for the time being at least, arrested the decline in world output; however, it would probably require several years of statisfactory returns to encourage the industry to resume expansion.

15.2 GOATS

Goats are raised in all the provinces, in small flocks averaging three or four animals per holding. Because of the size and nature of goats, they fit in well on small-holdings and can be kept with little expense. Marginal lands unsuitable for other types of livestock may be used, and an inexpensive type of shelter will suffice. Goats are kept chiefly for milk production, the buck kids and culls being sold for meat. In parts of Canada where fresh cow's milk is difficult to obtain, the milk goat may be an economical source of nutritious milk. Goat's milk is particularly suitable for infants and invalids. Some Angora goats are raised for mohair production and handicrafts, but apparently the quality of the mohair produced has not equalled that of the imported product.

15.2.1 The Primary Sector

The Canadian goat population is much the same today as it was in 1951 but is concentrated in fewer production units (Table 15.6).

Table 15.6 GOAT POPULATION AND INDUSTRY STRUCTURE, CANADA, 1951, 1961 & 1971

	1951	1961	1971	1951	1961	1971
	- Population -			- Number of Farms -		
Maritimes	997	873	613	-	340	188
Quebec	1,338	3,672	2,620	-	1,488	394
Ontario	4,406	7,495	7,129	-	2,253	1,533
Prairie Provinces	7,770	8,425	5,411	-	3,095	1,979
British Columbia	3,210	3,027	2,068	-	589	435
Total	17,721	23,492	17,841	-	7,765	4,529

Source: Statistics Canada, Census of Agriculture, 1951, 1961, 1971.

The milder climate of Southern British Columbia would be expected to provide more attractive conditions for raising goats than the colder parts of the country. However, census figures of the goat population do not bear this out. Goats are raised in all the provinces and it would seem that this animal will thrive in most locations; the extra cost of wintering in the colder regions does not appear to be a restricting factor. Probably a more important factor in the location of operations would be the proximity to fair-sized population centers.

At the peak of production, a good doe from one of the top milk breeds will give 5.7 to 8.0 litres per day. Does on test have given 1020 kilograms of milk and 38 kilograms of butterfat during a ten-month lactation. European breeds of goats highly selected for milk production can give as much as the 'average' cow, namely 3,600 kilograms per year. Milk goats reach their prime milk production at about four years of age and may be useful as milkers and breeders for 10 to 15 years.

Young does are not bred before 10 to 18 months of age (depending on the breed). The gestation period is approximately five months. Twins and triplets are fairly common, with occasional singles, quadruplets or even quintuplets.

Feeds suitable for dairy cows are, in general, suitable for milking goats, except that goats prefer coarse-ground or whole grains. Feedstuffs include legume or legume/grass hay, silage, roots, beet pulp, corn, barley or oats. Good use is made of an opportunity to pasture on rough (or imporved) land and to brouse shrubs.

15.2.2 The Secondary Sector

Goat Meat

Few, if any, of the domestic goats pass through the stockyards. The buck kids are usually sold at the farm gate. Production is aimed at the Easter market and, in 1976, kids sold in Ontario at six to eight weeks of age (weight 9-11 kilograms) brought $3.30 per kilogram.

Slaughterings vary appreciably from year to year and those shown in Table 15.7 refer mainly to goats imported from the United States for the Easter market.

Table 15.7 FEDERALLY INSPECTED SLAUGHTER OF GOATS, CANADA, SELECTED YEARS, 1951 TO 1975

Year	Head	Dressed Weight (kg)
1951-52	205	-
1956-57	112	-
1961-62	103	-
1966-67	2,848	-
1971-72	8,172	78,005
1975-76	7,701	73,510

Source: Health of Animals Branch, Agriculture Canada

Goat's Milk and Cheese

There is little commercial traffic that can be pinpointed in the above items. Many producers sell milk (and sometimes cheese) locally, but no figures are available and the total value is probably small. Apparently, in areas where they are known, the milk and cheese experience good consumer acceptance.

However, the small quantities available in any area militate against commercial interest in those products.

Goat Skins

There does not appear to be any trade in this item. In the domestic operations, the kids are sold alive at the farm gate and as far as is known, the skin is destroyed. In the case of the Easter imports, the story is essentially the same. Information from Toronto is to the extent that after slaughter the carcasses are taken by retailers with the skin on, and sold in that condition. Even if the skins from these immature animals were available in quantity, it is doubtful if they would be of significant value.

15.3 HORSES

15.3.1 Introduction

At one time in Canada, horses provided the major source of power for tilling the soil, transportation on land, ranching, lumbering, and many other enterprises. Since the late 1930's, they have been rapidly replaced by tractors, automobiles and other machinery, and their numbers have declined drastically.

In the past ten years, however, there has been renewed interest in horses, primarily for recreation. There is evidence of recent rapid increases in light horse populations, mainly in Alberta, Ontario and Quebec. Racetrack betting and local horse shows and exhibitions are also increasing. Thus, most horses today are found in urban fringe areas, while they were formerly located chiefly in rural areas.

In addition to recreational use, horses are used to a limited extent for the production of meat and pharmaceuticals and for draft power on farms and in lumber camps.

15.3.2 The Primary Sector

Resource Utilization

Horses require mainly forages, with emphasis on pasture and hay for feed. Some grain and protein-mineral-vitamin supplements are also required. Approximately 103,000 hectares for pasture, 143,600 hectares for conserved forage and 178,000 hectares of grain are the estimated annual requirements of the Canadian horse population manufactured feed requirements are estimated at 36,000 tonnes per year.

Veterinary services for horses are an important aspect of animal health services, and clinics are found in all veterinary colleges. Considerable demand is placed on provincial laboratories for diagnostic services.

Industry Structure

In the period 1950-73, the horse population in Canada decreased by 74 percent from 1.3 million to 342,000 (Table 15.8). The number of census farms reporting horses has halved since 1961. In the same time period, the number of farms reporting one to seven horses has decreased, reflecting the decreasing numbers of draft animals, and the decreasing numbers of horses in general in the farm community. For the same period, the distribution of horses on Canadian farms nonetheless indicated a growing proportion of one-horse farms, from 34.6 to approximately 41 percent of all horse farms (Table 15.9). The proportion of farms reporting more than eight horses is also increasing which corresponds to the increasing number of horses found in boarding stables and riding establishments in urban fringe areas.

Information on the Canadian horse population is generally fragmentary; Statistics Canada data includes only horses on census farms so that much of the available information is derived from the various provincial or breed association statistics. The number of horses on non-census farms has been increasing, so it is difficult to estimate the actual population or population trends. There are indications that numbers of horses in Ontario and Alberta are on the increase, with emphasis on horses for pleasure. Information is lacking on numbers of commercial draft horses used on farms and for such operations as lumbering, but it can be stated these have declined to fairly low levels, where they appear to have stablized. Some draft horses are still bred for the 'showing'.

It would appear that horse production for recreation and meat will be increasing in the future. Demand for draft use may also increase as fossil fuels become scarcer and more expensive. There is potential for increasing horse production in remote northern areas as they are extremely winter hardy.

Table 15.8 HORSES ON FARMS BY PROVINCE, CANADA, SELECTED YEARS, 1951 TO 1971

	B.C.	Prairies	Ontario	Quebec	Maritimes	Canada
			- 000 head -			
1951	36.1	695.9	260.6	232.9	78.3	1303.8
1956	26.8	400.4	139.6	163.5	51.8	782.1
1961	23.9	274.3	88.9	97.4	26.1	510.6
1971	32.5	187.0	79.9	43.5	10.7	353.6

Source: Statistics Canada, Census of Agriculture, 1951-1971.

Table 15.9 CENSUS FARMS REPORTING HORSES, SELECTED YEARS, 1961, 1966, 1971

Horses (all ages)	1961	1966	1971
Farms Reporting................	203,227	141,351	111,261
1 horse......................	34.6	43.5	41.2
2 horses.....................	42.1	31.6	26.8
3-7 horses...................	20.0	20.4	25.3
8-12 horses..................	1.8	2.5	3.7
13-17 horses.................	0.5	0.7	1.1
18-32 horses.................	0.5	0.8	1.2
33-47 horses.................	0.2	0.2	0.3
48-62 horses.................	0.1	0.1	0.2
63 horses and over...........	0.1	0.2	0.2

Source: Statistics Canada, Census of Agriculture, 1951-1971.

Statistics on registered horses are more precise. In general, the total number of registered horses in Canada is increasing (Table 15.10), with the main increase in light horses such as Arabian, Hackney, Hunter, Morgan, Palomino, Quarter Horse and Thoroughbred (Table 15.11). Draft horse registrations are increasing slightly (Table 15.12).

Riding Horses

The majority of horses now in Canada are relatively light weight animals employed for riding and other recreational uses, and found mainly in urban fringe areas. Only a small proportion of these are registered, and statistics as to total numbers are rough estimates only.

The Ontario Riding Horse Establishment Act is typical of recreational developments taking place in the Canadian horse industry. As the emphasis on riding pleasure horses becomes heavier, legislation becomes essential. The Act, which took effect in 1973, is concerned with the health, care, and housing of riding horses. In the year 1973-74, licenses were issued to 349 riding horse establishments for a fee of $25 each, three inspectors made over 1,800 visits, and a maximum of 10,600 horses were maintained on licensed premises. A similar level of activity has been maintained since.

The Alberta Department of Agriculture instituted its Horse Industry Branch in 1972 to meet the demands of an expanding industry, and specifically to supply requests for information on management, nutrition and equestrian events. Since then, the Branch has conducted a number of three-day horse management clinics among other activities in its extension program, encouraged equine research at universities and colleges where

Table 15.10 TOTAL HORSE REGISTRATION BY PROVINCE, SELECTED YEARS, 1951 to 1975

	B.C.	Prairies	Ontario	Quebec	Maritimes	Canada
1951	115	457	1033	222	84	1883
1956	173	471	1560	877	58	3140
1961	260	627	1327	149	30	2536
1966	411	832	1194	263	35	2783
1971	606	1162	1707	262	47	3745
1975	1053	1856	2083	400	101	5952

Source: Canadian National Livestock Records.

Table 15.11 LIGHT HORSE REGISTRATIONS, CANADA, SELECTED YEARS, 1951 TO 1975

	American Saddle Horse	Arabian Horse	Canadian Horse	Hackney Horse	Hunter Horse	Morgan Horse	Palomino Horse	Canadian Quarter Horse	Thoro
1951	48	22	15	59	45	1	-	-	
1956	45	30	17	89	53	1	57	-	
1961	90	119	23	110	67	19	70	69	
1966	100	228	18	113	90	43	50	196	
1971	107	459	62	140	277	89	47	130	
1972	113	423	19	166	219	154	42	127	
1973	128	555	45	141	257	191	33	136	
1974	131	623	25	134	286	260	28	256	
1975	149	1408	33	159	342	315	46	512	

Source: Canadian National Livestock Records.

Table 15.12 DRAFT HORSE REGISTRATIONS, CANADA, SELECTED YEARS, 1951 TO 1975

	Belgian Horse	Clydesdale Horse	Percheron Horse
1951	127	131	154
1956	146	127	141
1961	222	101	157
1966	174	80	145
1971	155	69	138
1972	104	84	112
1973	126	78	98
1974	169	98	157
1975	243	93	163

Source: Canadian National Livestock Records.

expertise and facilities exist, and established a stallion fertility testing station at Olds College. More recently in 1975, the Branch instigated a Horse Improvement Program.

The Quebec Department of Agriculture conducts several activities aimed at improving the genetic merit of its herd: inspection and classification of stallions as well as financial assistance to producers buying purebred mares and using or buying recommended stallions. The Deschambault Research Station conducts a small breeding program for the Canadian horse and maintains a horse handling school. The province's overall improvement program aims firstly at satisfying the demand for riding horses, while maintaining a basic number of draft animals.

Racetracks

In 1976, there were 107 racetracks holding races for standardbreds and thoroughbreds. There were 4,132 race dates, and 39,894 races during the year. Of these, 33,697 were harness and 6,197 thoroughbred. Purses totalled $65.7 million and racetrack attendance reached nearly 13 million. Wagering totalled $1.1 billion, an increase of 78 percent over 1951 (Table 15.13). Until 1977, racetrack betting supervision was the shared responsibility of the Royal Canadian Mounted Police and of Agriculture Canada. The latter now assumes all responsibility for protecting the public, from photo-finishing to urine-testing of the horses.

Table 15.13 RACETRACK BETTING, CANADA, SELECTED YEARS, 1951 TO 1976

	Purses	Number Tracks	Number Race Dates	Attendance	Wagered
1951	$ 3,291,545	18	401	--	$ 62,562,445
1956	5,205,289	45	716	--	106,034,387
1961	79,525,301.50	65	1,152	3,351,430[a]	163,258,089
1966	16,540,658	78	1,748	7,192,587	353,790,673
1971	30,313,411.50	89	3,000	10,051,436	564,792,223
1976	65,763,057.89	107	4,132	12,819,540	1,123,213,328

[a]Harness only.

Source: Livestock Division, Agriculture Canada.

Employment figures for the racing industry are only available for the standardbred sector. Since 1961, the number of standardbred owners has more than quadrupled, the number of trainers has more than tripled, and the number of drivers has doubled (Table 15.14)

Table 15.14 EMPLOYMENT IN THE STANDARDBRED RACING INDUSTRY, CANADA, SELECTED YEARS, 1961 TO 1971

	1961	1966	1971	1975
Owners	3,868	9,169	18,618	17,098
Trainers	590	950	1,966	2,157
Drivers	1,616	1,385	2,676	3,138
Grooms	1,347	1,200	2,118	2,553

Source: Livestock Division, Agriculture Canada.

Horse Shows and Rodeos

In 1975, the National Equestrian Federation of Canada recognized 327 horse shows of which 107 were in Ontario. In the latter province, the government distributed $3,600 in grants to 12 regional horse shows. The Canadian Horse Shows Association recognized 24 horse shows in Alberta in 1972, while in 1973, the Canadian Rodeo Cowboys Association sanctioned 37 rodeos. There are also many smaller shows, country fairs, gymkhanas during the summer, and training shows during the winter.

Of the 566 respondents to the Alberta Light Horse Study questionnaires, 60 percent owned at least one horse which they showed.

Pharmaceutical Production

The chief product is pregnant mare urine (PMU), used for hormones and other biological products. In Ontario, production is regulated by the Pregnant Mare Urine Farm Act, which was established in 1970 to ensure the proper care, health and housing of horses on PMU farms. The Act provides for the licensing and inspection of PMU farm operators, operator-contractors, and contractors. Licence fees are $10 per year for farm operators, and $50 per year for operator-contractors and contractors. The Act prohibits the transfer of possession of foals that are under 90 days of age, except where: (1) possession of dam is transfered with foal to same person; (2) foal is orphaned; (3) special permit from Director of Veterinary Services Branch is given.

In 1971-72, the value of PMU was $10.00 per liter, giving an average income of $300 per mare. Some 400 to 500 inspections are made each year by Ontario veterinary inspectors. Trends in Ontario PMU production since 1970 point to an increasing number of mares (Table 15.15).

Table 15.15 PRODUCTION OF PREGNANT MARE URINE, ONTARIO, 1971 TO 1975

Year	No. Operators	No. Mares
1970-71	125	3300
1971-72	107	2536
1972-73	100	2757
1973-74	105	3257
1974-75	-	3879

Source: Ontario Ministry of Agriculture and Food, Annual Review, 1971-1975.

In 1975, there were approximately 8,000 mares kept for PMU production in Quebec and of these 75 percent were draft animals.

PMU is produced in other provinces, but legislation concerning such production not being uniform, there are no total industry statistics.

15.3.3 The Secondary Sector

Slaughter

There are seven packing plants in Canada which slaughter horses: two in Alberta, one in Ontario, and four in Quebec. Four plants have begun operations since 1971 and numbers of horses slaughtered have more than tripled since 1971-72 indicating that horses are being slaughtered in Canada more and more rather their being exported alive (Tables 15.16 and 15.17).

In addition to meat for human consumption, horses provide these valuable by-products: hides, horse hair, animal glue, and meat for pet and mink food.

Horses slaughtered at federally-inspected plants are cull animals or by-products from all sectors of the horse population. Horses are not raised specifically for meat.

Inspected slaughter figures do not include considerable numbers of cull horses slaughtered at small abbatoirs for local use (meat for production of fur-bearing animals, etc.)

International Trade

Chief Canadian net exports are meat and hair (Table 15.18 and 15.19); in 1975, net exports in dollar terms of horses and horse products totalled $8.3 million (Table 15.20).

Table 15.16 HORSE SLAUGHTER BY DRESSED WEIGHT BY PROVINCE, CANADA, 1968 to 1975

	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76
					- kilograms -			
Alberta	4,109,105	4,635,130	4,382,659	4,191,762	4,498,766	5,840,089	4,388,023	5,964,743
Ontario	1,214,147	1,484,300	1,605,656	1,518,138	2,705,261	4,238,075	4,570,404	5,241,241
Quebec	1,386,506	1,344,542	1,357,158	1,651,590	4,932,035	10,543,406	9,676,312	11,073,240
CANADA	6,769,759	7,463,973	7,345,473	7,361,490	12,136,061	20,621,570	18,543,738	22,251,979

Source: Health of Animals Branch, Agriculture Canada

Table 15.17 INSPECTED HORSE SLAUGHTER BY PROVINCE, CANADA, 1968 TO 1975

	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76
					- numbers -			
Alberta	15,150	17,383	17,321	16,797	17.025	22,587	16,254	21,845
Ontario	3,954	5,047	5,638	5,113	9,553	15,263	17,227	19,024
Quebec	4,672	4,537	4,714	5,797	17,937	45,013	41,307	46,092
CANADA	23,776	26,967	27,673	27.707	44,515	82,863	74,788	86,961

Source: Health of Animals Branch, Agriculture Canada

Table 15.18 EXPORTS BY COMMODITIES, CANADA, SELECTED YEARS, 1951 TO 1975

	Horses for Slaughter	Horses NESa	Raw Horse Hides	Horse Hair	Animal Glue	Horsemeat Fresh or Frozen
	- numbers -			- tonnes -		
1951	10,270	802	59,642	-	232	-
1956	6,515	2,143	44,287	139	69	7,628
1961	8,197	1,389	22,270	75	404	5,283
1966	328	1,521	37,218	89	411	6,714
1971	2,473	3,048	16,402	58	551	5,333
1975	496	1,410	114,595	83	1,037	17,188

aNot elsewhere specified.
Source: Statistics Canada, Cat. 65-202.

Table 15.19 IMPORTS BY COMMOTITIES, CANADA, SELECTED YEARS, 1951 TO 1975

	Purebred Horses	Horses NESa	Raw Horse Hides	Horse Hair	Animal Glue	Horsemeat Fresh or Frozen
	- numbers -			- tonnes -		
1951	178	1,780	-	199	1,374	532
1956	325	1,849	7,533	44	1,191	5,327
1961	874	1,408	7,533	19	504	4,392
1966	1,146	11,828	17,274	31	832	-
1971	1,118	13,613	13,531	15	2,868	-
1975	997	61,446	48,914	12	2,186	-

aNot elsewhere specified.
Source: Statistics Canada, Cat. 65-203.

Table 15.20 VALUE OF EXPORTS & IMPORTS OF HORSES & HORSE PRODUCTS, CANADA, 1975

	Purebred Horses	Horses for Slaughter	Horses NES	Raw Horse Hides	Horse Hair	Animal Glue	Horsemeat Fresh or Frozen
			- $000 -				
Imports	2,842	-	9,339	325	19	2,799	-
Exports	-	78	1,406	1,223	113	944	19,865

Source: Statistics Canada, Cat. 65-202 & 65-203.

15.4 RABBITS

There are a number of countries where rabbit production constitutes an important source of meat (e.g. France). Rabbits can be produced on high fiber diets (mainly forage) and are not as competitive with humans for cereals as other species of domestic animals. They are equally well adapted to food production on small holdings in semi-urban areas and on large commercial units. Little effort has been expended in Canada on research and development and there is a minimum dissemination of information on production, in spite of the fact that rabbits have real potential for food production in this country.

15.4.1 The Primary Sector

Rabits are raised in almost all the settled areas of Canada. In the east, business is on a commercial scale around the larger metropolitan centres, namely in the Eastern Townships of Quebec and in South-Western Ontario. There is also some commercial production in Nova Scotia. With the exception of the Lower Mainland area of British Columbia, rabbit meat produced in the west is largely for home consumption or local sale with very little commercial production (Table 15.21).

In view of the comparatively small size of most Canadian rabbitries, labour-saving devices have not been of paramount importance. Some rabbitries use automatic watering systems.

Also, practically without exception, commercial operators feed commercially-produced rabbit pellets exclusively. This involves filling the feed hopper perhaps twice a week. Rabbit raisers are experiencing a cost-price squeeze through rising costs of feed pellets.

Table 15.21 RABBIT POPULATION AND INDUSTRY STRUCTURE, CANADA, 1971

	Population (head)	No. of Farms
Maritimes	4,773	319
Quebec	56,401	1,535
Ontario	105,538	3,281
Prairie Provinces	33,261	2,777
British Columbia	35,381	1,022
Total	235,354	9,934

Source: Statistics Canada, Cat. 96-719.

15.4.2 The Secondary Sector

The Market for Rabbit Meat

Rabbit slaughter has been decreasing since 1965 (Table 15.22), in spite of the fact that rabbit meat has gained consumer acceptance in the larger metropolitan areas where ethnic populations reside. Prices for slaughter rabbits fluctuate according to supply and demand, and are affected by the prices of other red meats.

Table 15.22 FEDERALLY INSPECTED SLAUGHTER OF RABBITS, CANADA, SELECTED YEARS, 1965 TO 1975

Year	Head	Dressed Weight kg
1965-66	84,719	-
1970-71	155,700	181,502
1971-72	136,625	162,653
1972-73	103,572	128,119
1973-74	62,967	76,031
1974-75	61,595	75,511
1975-76	36,103	44,035

Source: Health of Animals Branch, Agriculture Canada.

Retailers are generally unwilling to undertake any promotion of rabbit meat because they cannot count on a continuing supply of the product. The uncertain supply situation is felt also at the rabbit abattoirs, most of which are able to operate only one or two days a week.

In view of the potential demand for rabbit meat, there is a need to quantify the market, as well as a need for research into the supply problem; answers to these questions would allow for more efficient production.

International Trade

The statistics dealing with exports of rabbit skins refer mainly to skins of the western jack rabbit. It is not possible to identify domestic rabbit skins in these figures. Imports of rabbit skins have fluctuated greatly since 1951; in 1975, they totalled $192,000 (Table 15.23).

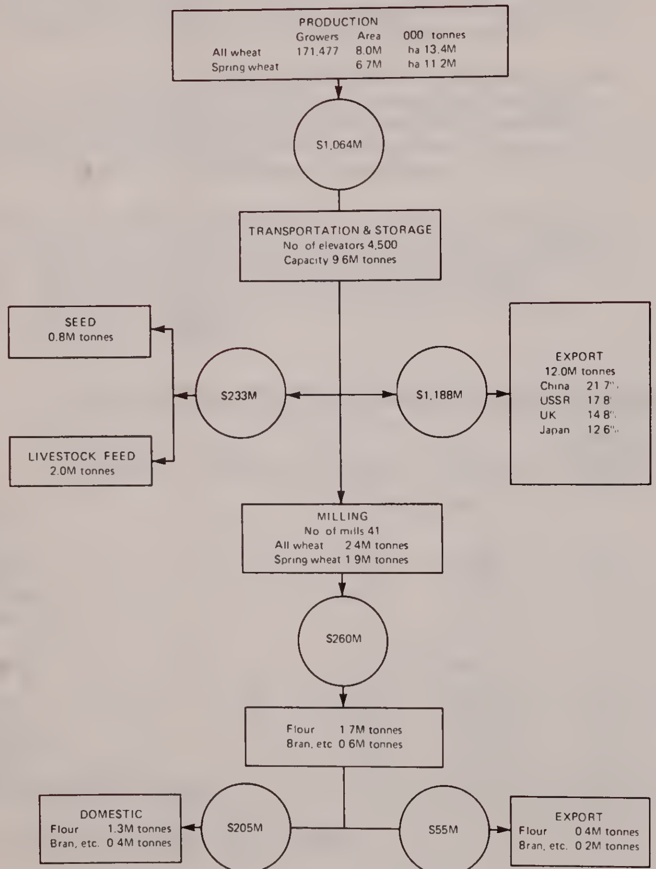
Table 15.23 RABBIT SKINS IMPORTS, CANADA, SELECTED YEARS, 1951 TO 1975

Year	Number
1951	93,016
1956	463,466
1961	131,383
1966	247,180
1967	132,033
1968	100,243
1969	209,026
1970	2,000
1971	1,000
1972	2,800
1973	113,799
1974	111,759
1975	66,066

Source: Statistics Canada, Cat. 65-203.

THE CANADIAN WHEAT SYSTEM

1970–1974 Average[a]



a Unless otherwise indicated
M Million

1. Wheat is Canada's dominant field crop. About 98 percent of the 10 to 12 million hectares planted annually is in the Prairie Provinces. In 1975, farmers in these provinces received $2,448 million from sales of wheat, more than 46 percent of their total farm cash receipts.

2. Wheat exports are an important source of foreign currencies. Wheat exports comprise 45 to 55 percent of the value of all Canadian agricultural exports, and about 6 percent of the value of all export commodities.

3. The domestic market for wheat is small. Export markets are relied upon to take about 75 percent of production.

4. Domestic use of wheat is mainly by the flour milling industry, which uses about 2.5 million tonnes a year, and by the animal feeding industry which uses about 2 million tonnes. Relatively small quantities are used by the breakfast food and chemical industries.

5. Canada's flour milling industry has been declining during the past two decades, reflecting the loss of export flour markets. This has been a result of increased milling capacity in former flour importing countries, and as a result of export subsidies by competing exporting countries.

6. One of the most difficult problems facing Canada's wheat growers is the wide fluctuation in demand and prices characteristic of the international wheat market.

7. With the exception of wheat used for domestic human consumption, for which the price is set under the two–price wheat program, the price the farmer receives for his wheat is basically that established in international markets.

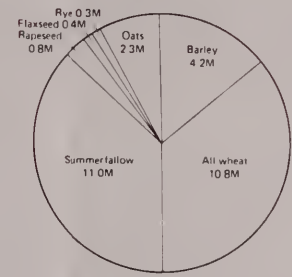
8. The Canadian Wheat Board is the sole marketing agency for wheat grown in Western Canada and entering interprovincial and export trade, with the exception of the small quantity of feed wheat shipped outside the designated area of its operation.

9. Canada's wheat growers are at a disadvantage relative to their competitors in inter–national wheat markets because of the long distance by rail and boat from their markets.

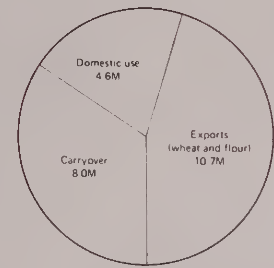
10. A comprehensive program of research has provided farmers with technology that enables large scale grain production. It is only because of the extensive nature of farming in the prairies that the wheats grown can compete successfully in the world market.

11. Continuing growth in the agriculture industry of Western Canada is to a large extent dependent upon Canada's ability to obtain a steady and expanding share of the world trade in wheat and flour.

FIELO CROP AREA, PRAIRIE PROVINCES, 1976
29.8M hectares

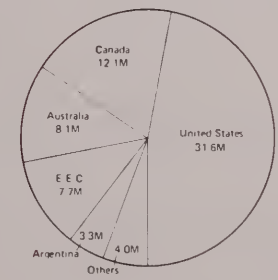


DISPOSITION OF CANAOIAN WHEAT, 1974–75
23 4M tonnes



AGRICULTURAL EXPORTS 1975
$3,916M

WORLD WHEAT EXPORTS, BY COUNTRY, 1975–76
(including flour)
66 5M tonnes



16. THE CANADIAN WHEAT SYSTEM

16.1 THE PRIMARY SECTOR

16.1.1 Regional Variation

Wheat has been and continues to be Canada's dominant field crop. During the 1960's, it typically occupied from 10 to 12 million hectares of cropland (Figure 16.1). During the 1970's, the area seeded has been most often between 8 million and 10 million hectares.

About 98 percent of the area planted to wheat in Canada is in the Prairie Provinces (Table 16.1). Ontario is the only other province where production is of commercial significance.

Wheat grown in Ontario is mostly a soft winter type used in the production of cake and biscuit flours. A large part of this production is used domestically for flour and feed, and that which enters the export market, some in the form of flour, is frequently for food aid in developing countries.

Wheat grown in the Prairie Provinces is mainly of the hard spring wheat varieties used for producing bread flour. Durum wheat is grown on a much smaller area in the Prairie Provinces. Its chief use when milled is in the production of pasta products. More than 75 percent of the wheat grown in the Prairie Provinces is exported.

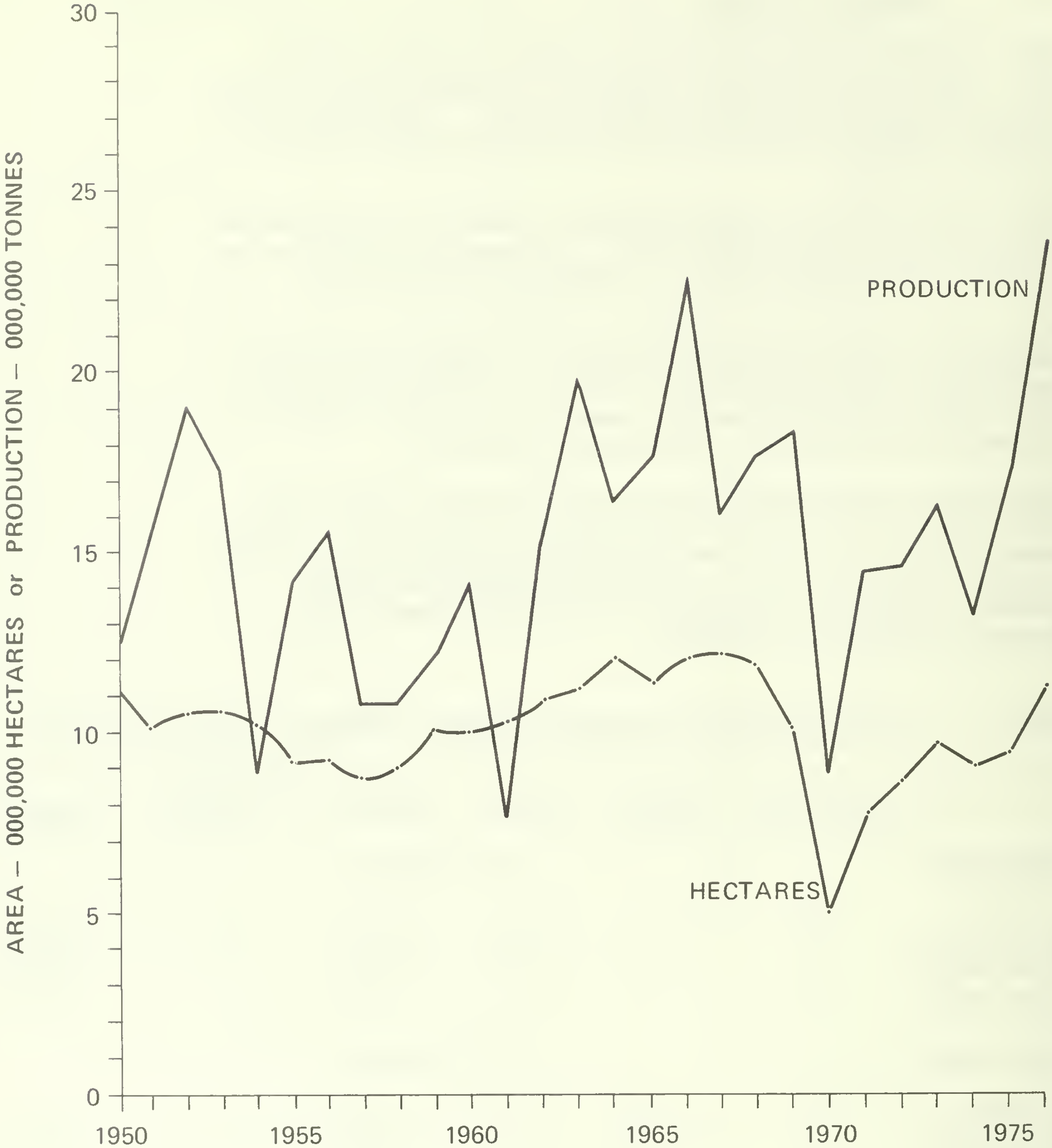
Table 16.1 WHEAT PRODUCTION AND AREA BY REGION, CANADA, 1975/76 CROP YEAR

	Maritimes	Quebec	Ontario	Prairies	British Columbia	Canada
Production:			- 000 tonnes -			
All Wheat	16	71	620	16,330	41	17,078
Spring Wheat	—	—	10	13,793	—	13,803
Winter Wheat	—	—	610	—	—	610
Durum Wheat	—	—	—	2,537	—	2,537
Area Seeded:			- 000 hectares -			
All Wheat	7	34	189	9,227	22	9,479
Spring Wheat	—	—	5	7,750	—	7,755
Winter Wheat	—	—	—	a	a	184
Durum Wheat	—	—	—	1,477	—	1,477

[a]Winter wheat not reported.

Source: Statistics Canada, Cat. 22-002.

FIGURE 16.1 WHEAT PRODUCTION & AREA, CANADA, 1950 to 1976



Source: Statistics Canada, Cat. 21–516

Wheat Production in the Prairie Provinces

The area seeded annually to wheat in the Prairie Provinces was at record levels of between 11 and 12 million hectares from 1964 to 1968 accompanying and following a period of high export demand in the mid-sixties. During the early 1970's, the area decreased following government encouragement in the face of large world wheat stocks to reduce wheat planting and increase the amount of barley and oilseeds. During the past three years of reduced world stocks, farmers were advised to increase wheat planting again. They responded in 1976 and increased planting by 1.6 million hectares to 10.8 million hectares. The increase, however, resulted in correspondingly smaller planted areas of rapeseed, flaxseed and barley.

Importance to the Economy

Some 40 percent of farm cash receipts in the Prairie Provinces is from the sale of wheat. During the 1950-54 period, this averaged 47.1 percent. In 1975, receipts from wheat were $2,448 million, 46.4 percent of total farm cash receipts.

Exports of wheat are an important source of foreign currency for Canada, representing from 45 to 55 percent of the value of all Canadian agricultural exports and about 6 percent of the value of exports of all commodities. Wheat exports in 1975 were valued at $1,996 million.

Characteristics of the Region

The climate of the Prairie Provinces may be classed as ranging from semi-arid to sub-humid. Winters are extremely cold with little snow cover.

Soil wise, the prairie region may be divided into three broad belts or zones in which there are certain common features: (1) the Brown Soil Zone,(2) the Dark Brown Soil Zone and (3) the Black Soil Zone. Outside the broad prairie, forest is the natural ground cover for most of the adjacent agricultural area. In this cooler and more humid region, the Grey-Wooded Soil Zone occupies the largest area, but there are numerous types with somewhat similar potentials and problems. The Brown Soil Zone is characterized by low annual precipitation and high seasonal evaporation. There are frequent severe droughts and wide variation in crop yields. Wheat is the main cultivated crop. Almost all of the arable land has been brought under cultivation.

In the Dark Brown Soil Zone, severe droughts are less frequent but crop yields are also variable. Soil and climatic conditions permit the production of some coarse grains but it is still primarily a wheat growing area. Almost all the arable land in this zone has been improved.

Severe drought is rarely experienced in most of the Black Soil Zone but frost occasionally causes damage to crops. Outside the southern parts of this zone, where wheat is usually the predominant crop, coarse grains, including barley for malting, rapeseed and forages are grown with wheat. Summerfallow is used extensively in this zone as a weed control measure, and it is here that there seems to be some potential to reduce its area and in turn increase the crop area. In the Red River Valley area of Manitoba, the climate is the most favourable and small area of crops such as sunflowers, sugar beets, potatoes and canning corn are grown. There is still some land in the Black Soil Zone that might be broken for crop production but the area is relatively small, is within the boundaries of present farms and is covered with trees.

Moisture conditions in the Grey-Wooded Soil Zone are generally favourable for crop production but the soils are typically low in fertility. In much of this area, the growing season is relatively short. Seeding and harvesting are often delayed and grain quality affected by rain, frost and snow. Wheat, coarse grains and forages are grown throughout the area. Some potentially arable land remains in this area.

The present use of land and the structure of the agriculture industry in the Prairie Provinces resulted from the experiences of farmers under the physical, economic and institutional conditions that have prevailed for many years. These decades have shown that crop alternatives are few, and grain growing has paid farmers best. The use of summerfallow has become an established practice and in the semi-arid zones is considered a form of crop insurance.

Changes in Farm Structure

Structural change of prairie farms has been going on since settlement began. Once an area was settled, farm enlargement could only be achieved by obtaining control of existing occupied farm land. Farm consolidation, therefore, was going on in established areas as new areas were being occupied. Significant development of new lands continued until the mid-1960's. Between 1951 and 1966 occupied farm land area increased by 8 percent but has increased by only 0.7 percent since then.

Farm numbers in the Prairie Provinces were at a peak in 1941 when there were 296,469 census farms. By 1951, the number had decreased to 248,716. Between 1951 and 1976, farm numbers declined by 34 percent to 164,192. The average size of farm increased 64 percent from 201.5 hectares in 1951 to 330.6 hectares in 1976. The reduction in farm numbers and the increase in average size of farm serve to indicate the changing structure of grain farms in the Prairie Provinces.

However, it must be remembered that there are great variations in size and organization of farms not only between different areas but also within areas.

Average Yields

Average yields of wheat fluctuate tremendously from year to year. In 1954, the average yield in the Prairie Provinces was 830 kilograms per hectare because of rust damage. In 1961, the average yield was 710 kilograms because of drought. In 1976, average yields were expected to be a record at about 2,000 kilograms per hectare. The previous high was 1,861 kilograms per hectare in 1966. The overall trend has been a slow increase in average wheat yields. There is some indication that the average yield has increased more rapidly in recent years, but this is probably because yields of the recently-introduced slightly higher-yielding utility wheats are included in the average.

Locational Advantages and Disadvantages

The extremely cold winter with little snow cover limits the production of higher-yielding winter wheat varieties that are grown in wheat-exporting countries with milder winters such as the United States and France. The more or less semi-arid climate of a large part of the wheat growing area requires farmers to use summerfallow as a moisture conservation practice. From a third to a half of many farms is in summerfallow each year. In the higher-moisture areas, farmers have typically used summerfallow as a weed control measure.

The Prairie Provinces are disadvantaged in relation to wheat markets. Intraregional demand for wheat is relatively small, and the centre of domestic demand is more than 2,400 kilometers away. The nearest export markets for wheat are several thousand kilometers by rail and sea, away from the area of production; some are more than 16,000 kilometers away.

Thunder Bay, the port which traditionally handles more than half of our wheat exports, is closed to shipping because of winter conditions for about four months of each year. Ports of export on the west coast of Canada are open year-round, but are separated from the area of production by the vast Rocky Mountains with their extremely rugged terrain and winter snow problems.

Farmers in the Prairie Provinces have taken advantage of improvements in technology, and large-scale grain production is general. Only because of this can the bread wheats grown in Canada compete successfully for the high quality wheat markets of the world.

16.1.2 Research and Technology

Development of Varieties

The development of varieties has always been an important phase of wheat research in Canada. These have had to be selected to fit our growing conditions and climate. Red Fife wheat was the dominant red spring wheat in Canada and parts of the United States for the latter half of the last century. The world-famous variety, Marquis, developed at the Central Experimental Farm in 1904, was a week earlier in maturing and can be given the credit for opening up the west. Rust-resistant varieties have replaced Marquis, but its quality has remained the standard for breadmaking at home and abroad.

The three major activities commonly associated with crop breeding in Canada include: (1) the development of new crop strains for the many soil and climatic zones; (2) the assessment of varieties to determine their potential production in these zones; (3) background research in genetics and cytology to provide new information and genetics stocks.

Plant breeding is a sophisticated science. Selections are made after careful biological and chemical measurements have been taken and analyzed, often by precise statistical methods. Assessment is not confined to yield alone; quality and disease resistance are equally important. The end use or market potential must also be considered, whether the wheat is to be used for pasta or bread, or for feeding animals.

The financial return to the agricultural industry from the introduction of new cereal varieties is of considerable magnitude. It has been estimated for example that the rust resistant varieties of wheat, including Selkirk which was resistant to a prevalent race of rust, are worth more than $75 million a year.

Crop Management

Crop management research deals with the facts and principles essential to an understanding of crop production through such procedures as methods of cultivation, crop rotations, plant density and the general integration of all influencing factors. It is an area of investigation closely associated with several other functions, such as plant physiology, soil fertility and engineering, and the control of diseases, weeds, insects and vertebrate pests. In consequence, it lends itself to the 'systems approach'.

Many variables interact to influence the results of crop management practices. Weather, soil variety, machinery and storage conditions all have an influence on crop yield. Scientists are continually testing new techniques against the 'old way'. The difference in returns between good crop practice and poor management practice can be more than 50 percent.

Soils Research

Soils research has made an outstanding contribution to grain farming in Canada. Since the soil is the foundation on which agriculture is built, its management and utilization is one of the most important problems with which the nation must deal. The objective of the soil fertility and management research is to obtain a better understanding of the biological, chemical and physical properties of the soil and their interactions, and to apply this information to develop and maintain an efficient agricultural production system.

One major objective of the soil management program is to develop recommendations on fertilizers and soil amendments for cereals in the various soil zones of Canada. This includes the development of new fertilizer products and methods of application, improved methods of predicting nutrient requirements and more precise methods of nutrient budgeting for environmental protection. Within a region or province, research on soil fertility is well organized, and in cooperation with university and provincial people, good information is available to most cereal growers.

Protection from Diseases, Weeds and Insects

Protecting crops from the losses that arise from diseases, insect pests and weeds is an important aspect of cereal crops research.

Disease Control: While historically some research was undertaken in the first two decades of this century, it was not until the establishment of the Cereal Rust Laboratory in 1925 that a major effort was made to control cereal diseases. Since then, many pathologists have joined teams of plant breeders in the successful development of disease-resistant varieties. Some cereal diseases are ubiquitous in Canada, while others are confined to certain regions by climatic conditions. In epidemic form on susceptible varieties, there can be complete destruction by rust. For those diseases where resistance is not complete, there can be a 10-15 percent loss. Next in importance to rust are root rots and leaf diseases caused by organisms of the Helminthosporium or Fusarium complex. None of the major pathogens have been eliminated or completely disassociated from their hosts: research may be ahead for a time, but when barriers are altered or removed the diseases will gain prominence again. The temperate areas of Canada have a great abundance of pathogens.

The research effort expended for disease control in cereals in Canada has given handsome returns. Canada's research is of world renown. Chances of success for the future seem excellent.

Insect Control: Outbreaks of insect pests are often unpredictable and very costly. The main objective of the entomological research is to provide strategies for insect pest management that will have lasting economic benefit to the farmer and to society. Insect damage to cereal crops is confined to those years when outbreaks occur and in those areas where infestations are common. Grasshoppers left uncontrolled in the grassland area where they hatch, pose a constant threat for serious losses in Western Canada. Cutworms and wireworms may cycle through epidemic numbers. Aphids are a constant dual threat because they carry virus diseases.

The screening and testing of insecticides is of significance to cereal crop production. Cutworms and wireworms can be controlled through seed treatment. For aphids and grasshoppers, insecticides seem the only practical control method. With the recent increase in awareness of the impact of some insecticides on environment and public health, it is apparent that such products must be limited for uses that are essential to maximum crop production. Breeding for resistance to insects has had success in the control of some cereal insects.

Weed Control: During the last two decades, chemical control of weeds has reached major significance. Some 12 million hectares are sprayed annually in Western Canada. Herbicides, coupled with cultural control, will remain the main method of weed control for some time to come. The herbicide program includes the evaluation and development of new chemicals for the control of specific weeds, the elucidation of their mode of action, the persistence in the environment and more efficacious application methods.

Quality Standards

World markets demand specific properties for imported grains. Canada has, by regulations which force grades to conform to a variety standard, kept a very high standard for bread-making properties in spring wheat. At the same time, research in Canada and other countries, has shown that other qualities of wheat can be used if accompanied by changes in bread-making technology. Several years ago, a utility class of wheat was designated to accommodate wheat varieties which do not have the top quality of our high protein wheats, yet have better value than wheat usually put into feed classes. It is too early to decide whether the export market is prepared to pay sufficient for wheat of this class to ensure an economic return for the producer.

The quality of durum wheat varieties has changed considerably in the last few years. At one time, Mindum, an old American variety, was used as a standard. Today's standard, Hercules, has stronger gluten strength, deeper yellow color and larger kernels. Market analysis shows that the move to a different and higher quality standard has improved Canada's position in the export of durum to certain countries.

16.1.3 Farm Level Pricing

With the exception of the wheat used for domestic human consumption, for which the price is set under the two-price wheat program, the price farmers receive is basically that established on international markets. A number of government programs function to relieve some of the extreme risks associated with production and marketing and thus indirectly affect farm prices.

Canadian Wheat Board System

The Canadian Wheat Board (CWB) is the sole marketing agency for the wheat grown in Western Canada entering interprovincial and export trade, with the exception of a small quantity of feed wheat shipped outside the designated area of its operation. The CWB is incorporated under an Act of Parliament with the stated objective of "...marketing in an orderly manner, in inter- provincial and export trade, grain grown in Canada..." In its operation, the CWB attempts to (1) market as much as possible at the best price, (2) provide price stability for farmers and (3) provide equity of delivery opportunity among producers.

The fundamental concept employed by the CWB in paying producers is price pooling. The purpose of price pooling is to share market risks among all prairie grain farmers. The Board takes title to all grain delivered to it during a crop year, and the proceeds from the sale of this grain are put into a pool. After the expenses incurred in operating the pool are deducted, the net proceeds are distributed to producers according to their deliveries.

When a farmer delivers wheat to a country elevator, he receives an 'initial payment'. In the event that the CWB realizes a price less than enough to cover the initial payments plus the Board's costs, the deficit in the pool is made up by the federal government. In the 41 years of operation of the CWB, the wheat pool was in deficit only in 1968-69.

Under the CWB pricing system, the farmer receives the income from his grain sales in the form of two payments, and initial payment upon delivery to the local elevator and a final payment after the pool account has been closed and all proceeds and marketing costs accounted for.

Canadian Grain Commission

Although the Canadian Grain Commission has no power or duties with respect to price, it has jurisdiction over the grading and weighing of grain, the deduction made for dockage and shrinkage, elevator shortages or overages, and the deterioration of any grain during storage or shipment. It is also responsible for setting maximum charges for grain handling services at country and terminal elevators.

Ontario Wheat Producers' Marketing Board

The Ontario Wheat Producers' Marketing Board has authority to regulate and control the marketing of wheat locally within Ontario under the authorization of the Ontario Farm Products Marketing Act, and in interprovincial and export trade under the provisions of the Agricultural Products Marketing Act. In 1973-74, the Board became an agency for the marketing of Ontario wheat, and henceforth all wheat grown and marketed in Ontario must be sold to or through the Board.

Income Stabilization Measures

Initial Payments: The initial payment set each year by the Governor in Council for wheat delivered to the Canadian Wheat Board can be viewed as a minimum price. In the event that the Wheat Board realizes a price less than enough to cover the initial payment plus the Wheat Board's costs, the deficit in the pool is made up by the federal government.

Prairie Grain Advance Payments: A further means of contributing to income stability throughout the year for prairie farmers is the PGAP Act which authorizes the Canadian Wheat Board to make advance payments up to $15,000 per farmer against estimated deliveries under the quota during the course of the crop year.

Two-Price System: This program was introduced in 1973 to serve both consumer and producer interests. It effectively freezes prices of wheat used for domestic human consumption while providing a floor price for producers. The program is operative during the period 1973-74 to 1979-80.

Crop Insurance: The federal government pays 50 percent of the premium for provincially operated crop insurance schemes which insure wheat farmers against environmental hazards between the seeding and the harvesting of crops.

Western Grain Stabilization: Wheat farmers in the Canadian Wheat Board area have the opportunity to participate in a special income stabilization program established under the Western Grain Stabilization Act, 1976. Farmers and the federal government share in the contributions made to a stabilization fund. Contributions and payments are based on the marketings of wheat, oats, barley, rye, flaxseed and rapeseed.

16.1.4 Comparison With Other Countries

Although one of the main wheat exporting countries, Canada's wheat production is less than 5 percent of world production. It is surpassed in volume by the Union of Soviet Socialist Republics (USSR) with about 30 percent of world production, the United States with 14 percent, the People's Republic of China

(PRC) with 8 percent, and France with 5 percent. Previous to 1970, Canadian production was larger than that of France.

Canadian wheat has been recognized as the finest bread wheat offered in the world market and has normally commanded the highest price. Canada has achieved and maintained this reputation by having the highest possible quality and uniformity in our export wheats.

Yields of wheat in Western Canada are relatively low by world standards because rainfall is limited, and we cannot grow the normally higher-yielding winter wheats because of the severe winter cold and lack of snow cover. It is only because of the extensive nature of farming in Western Canada that these lower yielding bread wheats can compete for the high quality wheat markets of the world.

Our nearest export markets being a long distance away from the area of production, it is difficult to compete with Australian wheat in the area surrounding the Indian Ocean and with United States wheat in South and Central America. Also, as already mentioned, one of our main export facilities (Thunder Bay) is closed for four months of each year because of weather conditions.

16.2 THE SECONDARY SECTOR

When wheat from Western Canada enters the commercial market, it enters a vast and complex handling and transportation system consisting of thousands of grain elevators, thousands of kilometers of railway tracks with marshalling yards, thousands of freight cars, and millions of tonnes of lake- and ocean-going vessels. As the grain moves through the system, it and the facilities are checked by government inspectors to assure maintenance of quality standards, accurate weights and grades.

The domestic grain handling and transportation system has been steadily undergoing changes. Railway lines have been abandoned because of a low level of use, the federal government has provided some thousands of hopper cars to haul grain from country to terminal elevators, and country elevators are steadily diminishing in numbers. Between the early 1950's and 1976, licensed primary elevators declined from more than 5,400 to 4,100, while licensed capacity increased from 9.4 million tonnes to 9.6 million tonnes.

Domestic use of wheat is mainly by the flour milling industry which requires about 2.5 million tonnes a year and by the animal feeding industry (mainly poultry) which needs another 2 million tonnes (Table 16.2). Insignificant quantities of wheat are used in some breakfast food and chemical industries.

The Canadian flour milling industry has been declining slowly since the early 1950's when more than 3 million tonnes a year

Table 16.2 WHEAT PRODUCTION AND DISPOSITION, CANADA, 1974/75 CROP YEA

	000 tonnes
Stocks at start of crop year	10,089
Production	13,295
Imports[a]	0
Total supplies	23,384
Exports:	
Wheat	10,229
Wheat flour (in terms of wheat)	510
Total exports	10,739
Consumed in Canada:	
Human food[b]	1,904
Seed requirements	906
Industrial use[c]	22
Loss in handling[d]	77
Animal feed, waste and dockage[e]	1,699
Total domestic use	4,608
Stocks at end of crop year, July 31	8,037
Total disposition	23,384

[a]Includes wheat flour in terms of wheat.

[b]Food uses include wheat flour and breakfast foods.

[c]Distilling, miscellaneous foods, miscellaneous chemicals, pulp and paper and explosives industries.

[d]Includes drying loss, outturn loss (lake and rail), fire loss, storage loss, etc.

[e]Residual after estimating for other use.

Source: Statistics Canada, Cat. 22-005.

were milled (Table 16.3). This rate slowed in the late 1960's, and use is now about 2.5 million tonnes a year. The number of flour mills declined from 73 in 1958 to 41 in 1974. This decline in mills and production reflects the loss of export flour markets as former importing countries built their own flour milling industries, and, more recently, the competition of subsidized flour exports from the European Economic Community (EEC). There has been a slow increase in domestic utilization of flour as population increased but per-capita consumption is steadily declining.

The by-products of the flour milling industry - bran, shorts and middlings - are used in livestock feeding and a small quantity is exported. Production of these by-products is dependent on production of flour.

There are no federal government measures directly and exclusively affecting the milling industry. However, the industry benefits from any increase in export flour sales as a result of the insured credit program of the Export Development Corporation. Some flour is exported as food aid in programs of the Canadian International Development Agency. Insofar as the two-price wheat program assists in maintaining domestic bread consumption, the milling industry is assisted in maintaining its volume of operation.

Canadian flour exports, have been declining (Figure 16.2). Canada's share of the world trade in wheat and flour (in terms of wheat equivalent) has declined from more than 30 percent two decades ago to less than 20 percent. At times in the past, Canada has had difficulty competing in many export markets with United States wheat because of that country's export subsidies and special credit or barter programs. The United States' share of world wheat trade increased from about 30 percent to more than 50 percent during the past two decades. Its export subsidy program is inoperative at the present time but a return to a general wheat surplus situation could see it re-established.

Canada's share of the world trade has declined substantially because of competition from subsidized exports of the EEC and because of the establishment of flour mills in former importing countries. In 1950-51, world trade in flour (wheat equivalent) was 4,400,000 tonnes; Canada exported 1,489,000 tonnes and Western Europe 366,000 tonnes. In 1974-75, world trade in flour was 4,740,000 tonnes, of which the EEC shipped 2,456,000 tonnes and Canada 530,000 tonnes. Thus, the EEC currently has more than 50 percent of the world flour trade.

16.3 INTERNATIONAL MARKETING AND TRADE

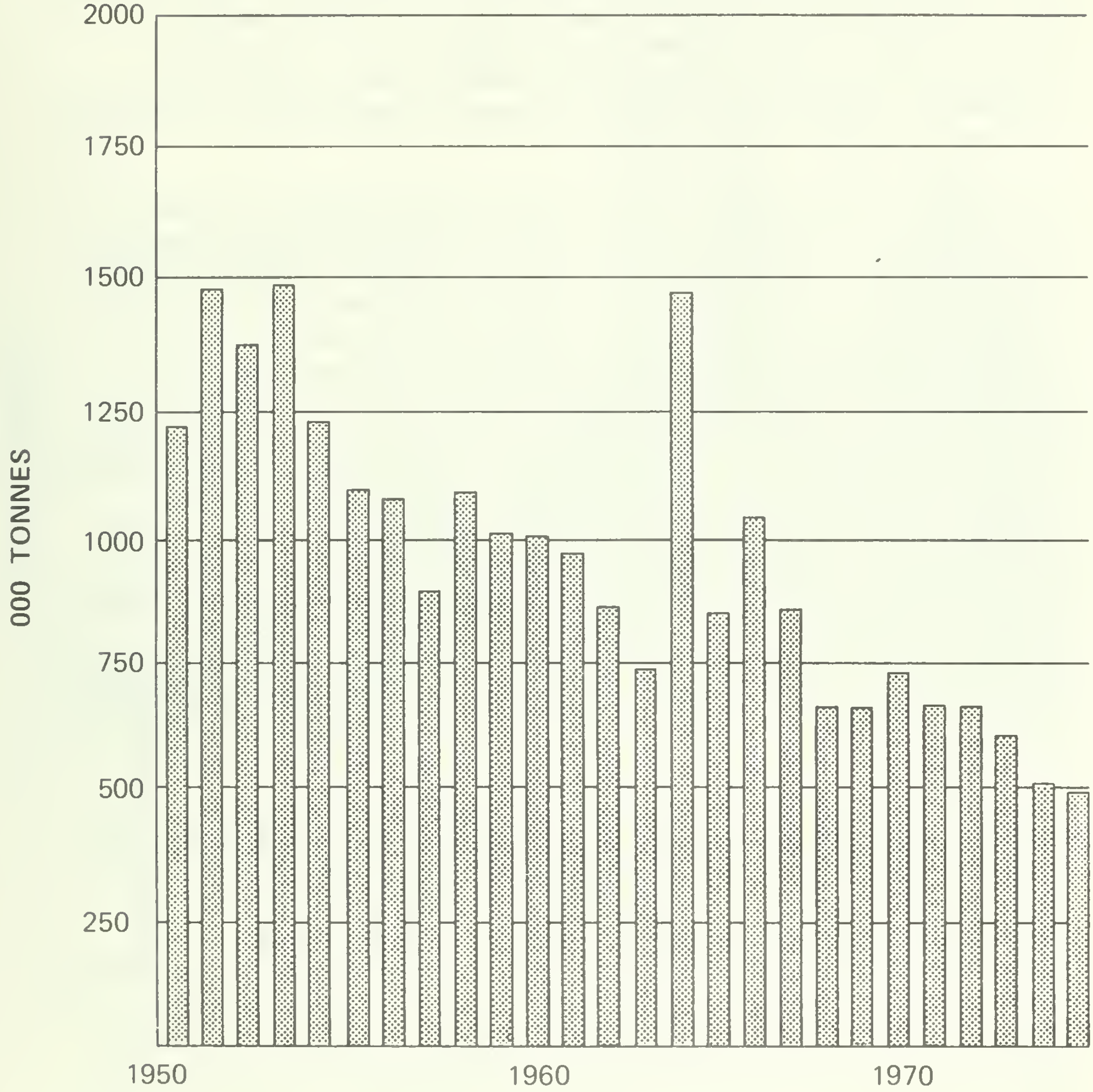
Wheat is the most important grain in terms of proportion of world grain production. It makes up about 27 percent of world grain production and has been slowly but steadily increasing this share. Wheat is grown in virtually all regions of the

Table 16.3 FLOUR AND MILLFEEDS PRODUCTION AND EXPORTS AND DOMESTIC CONSUMPTION OF FLOUR, CANADA, 1974/75

	000 tonnes
Wheat Milled for Flour	
Canada Western Red Spring	1,971.0
Durum	148.1
Ontario Winter	174.9
Other (e.g. Durum, Soft White Spring)	125.2
Total	2,419.2
Flour Production	1,770.0
Millfeed Production	713.8
Exports:	
Flour	369.6
Millfeeds	123.5
Domestic Consumption of flour:	
Total Consumption	1,347.7
Per Capita Consumption	59.9

Source: Statistics Canada, Cat. 22-201 & 32-226.

FIGURE 16.2 **EXPORTS OF CANADIAN WHEAT FLOUR, CROP YEARS 1949–50 to 1974–75**



Source: Canadian Grain Commission, Canadian Grain Export, 1974–75.

world with the exception of the tropics. The USSR, Europe and North America, are the world's most important producers of wheat and together account for about 60 percent of the world production.

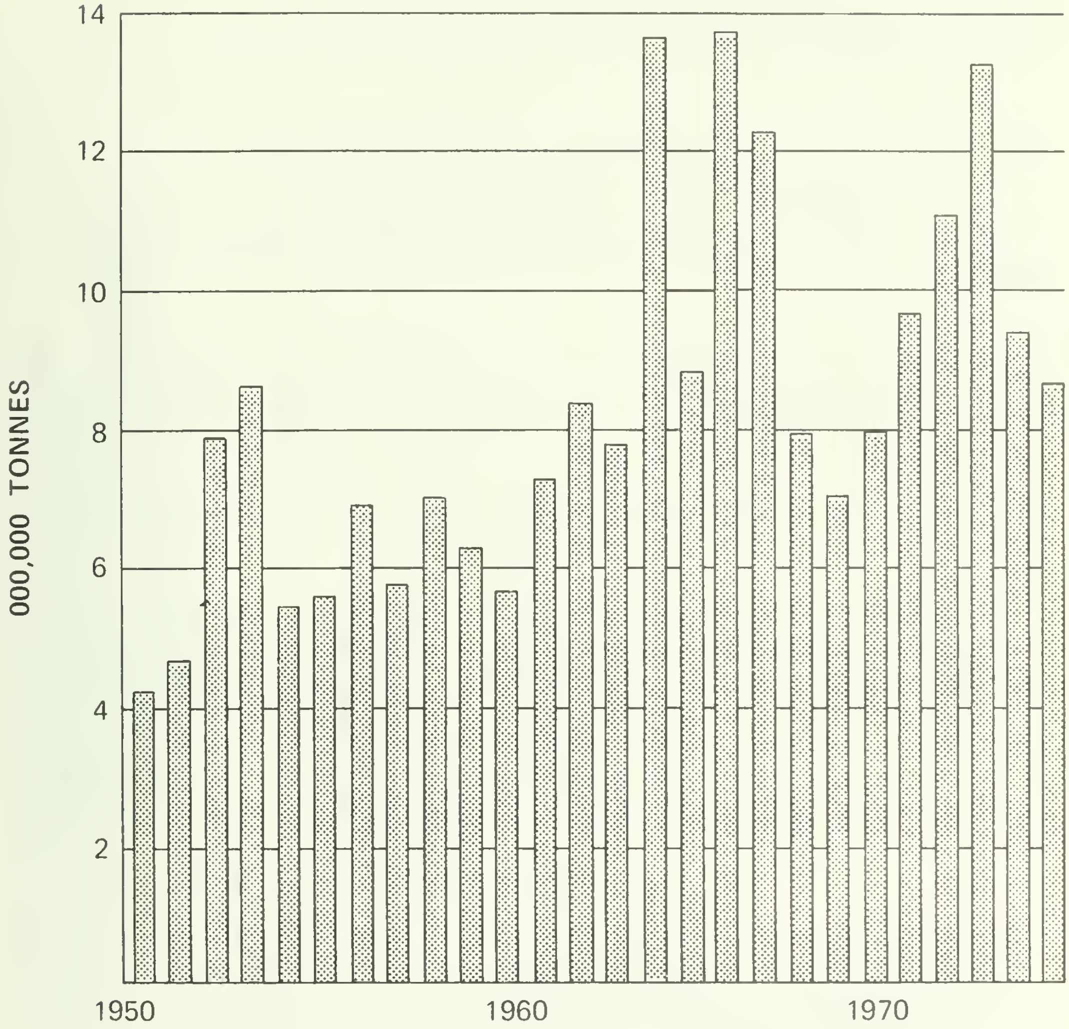
Only a few countries supply most of the wheat in export markets. The volume of wheat traded in international markets is small relative to world production. Canada, Australia, the United States, Argentina and the EEC are frequently grouped as the world's five main wheat exporters. In recent years, Argentina has had relatively small quantities of wheat for export. The trend has been for Canada's wheat exports to increase although the volume fluctuates substantially from year to year (Figures 16.3 and 16.4).

Throughout the post-war period, world grain production and trade has been distorted as a result of widespread government intervention. The reasons for distortions are complex, but basically they stem from the internal political, social and economic preoccupations of governments. Governments have intervened extensively in their agricultural sectors in an attempt to achieve a complex and often conflicting set of objectives. A central one common to developed market economies has been the desire to reduce the income disparity between farm and non-farm sectors. Other objectives have included farm income and price stabilization; maximization of agriculture's contribution to the balance of payments, by either reducing dependence on foreign supplies and simultaneously saving scarce foreign exchange reserves or maximizing export earnings; security of food supply for domestic consumers for defense and other reasons; and maintenance of rural communities in order to minimize economic, social and political strains on the rest of the economy.

In developing policy instruments to meet these domestic objective, governments have paid little or no attention to the direct or indirect adverse affects of these policies on international trade. In particular, governments have shown a widespread tendency to rely on commodity price supports in excess of free market levels to meet certain income objectives. Invariably income support via the commodity price mechanism has resulted in the intensification of import restrictions and the use of export aids. World grain production and trade has also been distorted by such techniques of government intervention as input, transportation and storage subsidies.

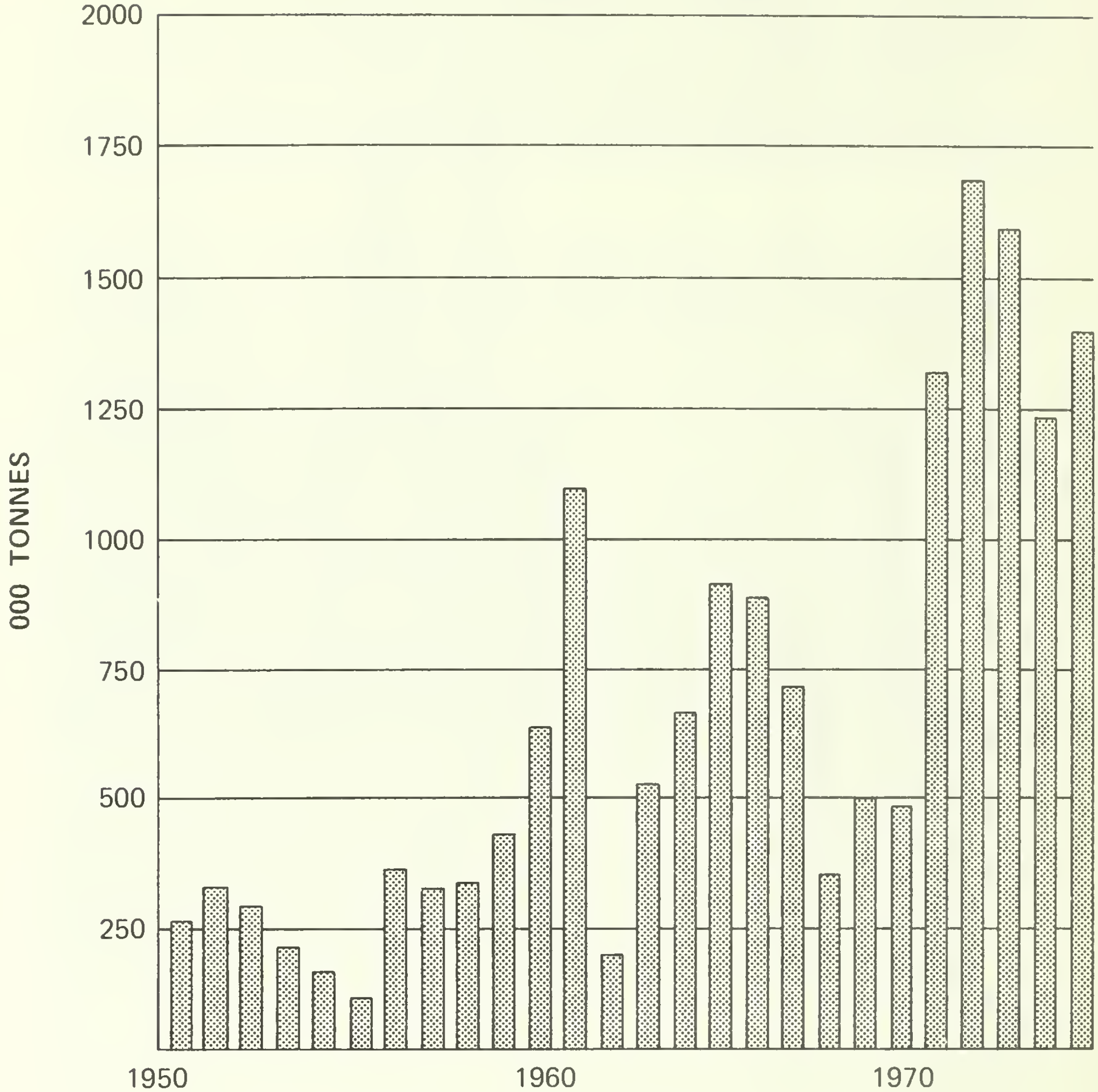
Examples of policy decisions contributing to instability of international markets would be the decision by the United States not to carry large stocks of wheat thereby accentuating an over- and under-supply in world markets, the decision by the USSR to sustain livestock production rather than deplete herds in times of short feed grain crops and the decision by the EEC to maintain a system of high price supports for grains under its Common Agricultural Policy with its attendant trade barrier effects in times of surplus.

FIGURE 16.3 **EXPORTS OF CANADIAN WHEAT, CROP YEARS 1949–50 to 1974–75**



Source: Canadian Grain Commission, Canadian Grain Exports, 1974–75.

FIGURE 16.4 **EXPORTS OF CANADIAN DURUM WHEAT, CROP YEARS 1949–50 to 1974–75**



Source: Canadian Grain Commission, Canadian Grain Exports, 1974–75.

There are a number of factors within the grains sector which are conducive to international market instability, particularly that of wheat. Wheat is a commodity that: has a relatively inelastic demand; in the short-term has inelastic supply; is dependent on climate for production and harvesting; has no coordinated global storage programs (and sometimes inadequate storage facilities at the national level); and has two major producers, the PRC and the USSR whose refusal to provide crop situation and outlook information inhibits global market assessment.

Developments outside the grains sector contributing to instability in the market include the rapid increase in oil costs as a result of soaring resource prices and their effects on the balance of payments and foreign exchange rates of many countries.

Canada has been a supporter of the principle of international cooperation in grain production and marketing, as a means to offset the effects of variability in production, markets and prices. To this end, Canada has been a member of all international agreements related to the marketing of wheat and has participated in all multilateral negotiations of the General Agreement on Tariffs and Trade (GATT).

The current proposals for the establishment of world grain reserves to help overcome the problems of world food security receives Canada's support contingent on the development of suitable arrangements for implementation. Suitable arrangements include the sharing of obligations by importers and exporters in carrying any reserve and assurance that the reserve will not interfere with normal commercial markets.

16.3.1 International Wheat Agreement

The first International Wheat Arrangement (IWA) was signed in 1949 and was in effect until 1953, revised versions being in effect until 1967. An International Grains Arrangement (IGA) negotiated in 1967 became operative in 1968, when exporters were trying to dispose of large stocks of wheat in the face of declining import requirements. Non-member countries, some of them former importers, had increased production and were selling wheat on world markets at less than the minimum price of the IGA. This action accompanied by a lack of pricing cooperation by member exporting countries resulted in the breakdown of the pricing, rights and obligations provisions of the IGA.

The IWA signed in 1971, in contrast to previous agreements, contained no pricing provisions nor rights and obligations for importer and exporter members because countries could not agree on many of the technical aspects which would form part of an agreement. The agreement has been extended three times by protocol, the last of these covering the period July 1976 to June 1978.

Work continues within the IWA to find a basis for a successful negotiating conference leading to an international agreement governing trade in wheat.

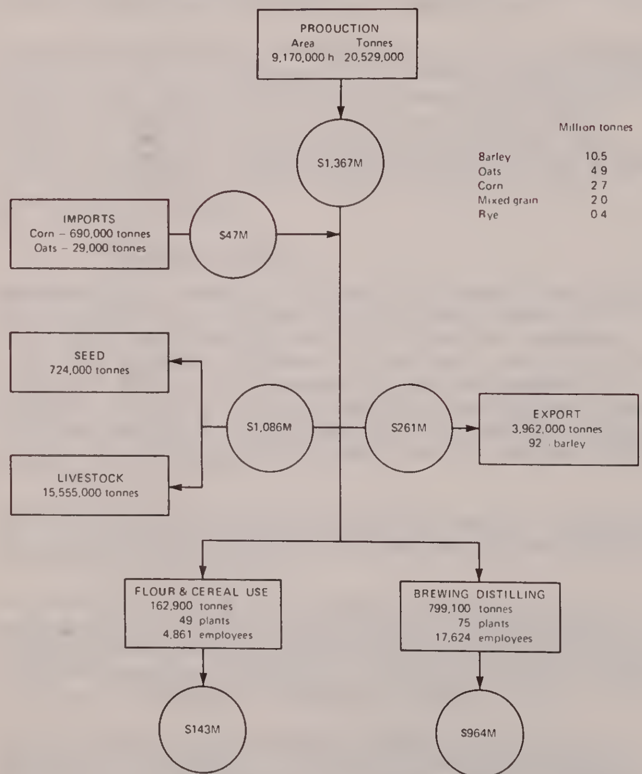
16.3.2 GATT

Multilateral trade negotiations under the auspices of the GATT are under way in Geneva. It is probably the most comprehensive and far-reaching trade negotiation yet attempted, and progress has been extremely slow. Negotiations related to grains have been more or less at a standstill - meetings have largely been discussions of procedure and of technical details.

Canada's approach to the negotiations in Geneva is that they should deal with reductions in the various government measures which distort international trade in grains, including those domestic income and production policies which interfere with trade, as well as both import barriers and export subsidies.

THE CANADIAN NON-WHEAT CEREAL SYSTEM

1970-1974 Average



[a] Unless otherwise indicated
M Million

1. Non–wheat cereal grains (barley, oats, corn, mixed grain and rye) as a group are very important Canadian agricultural commodities. The average annual farm value for the 1970–74 period was $1.4 billion.

2. The average annual production for the 1970–74 period of 20.5 million tonnes of non–wheat cereal grains was produced from coast to coast on 9.2 million seeded hectares. The land area required for this production is much larger since these grains are produced as part of a land use rotation. In the prairies, summerfallow is a significant part of the cropping rotation.

3. The main regions of production are the prairies and Ontario, with 94 percent of these cereals in the 1970–74 period. The prairies produced 73 percent of the farm value of production of these cereals from 80 percent of the seeded hectares. The comparative figures for Ontario were 23 and 14 percent respectively. The indicated higher value of production per hectare for Ontario was due to both a higher yield level per hectare and a higher farm value per unit of production.

4. The main grains in terms of value of production within this group for the 1970–74 period were barley 50 percent, oats 23 percent, corn 16 percent and mixed grains 9 percent. The mixed grains are mainly barley and oats. The acreage and production of corn has been increasing significantly in Ontario, the main corn producing area.

5. The variation from year to year in yield and prices in the Prairie Provinces results in a large variation in the residual return to farm labor and management.

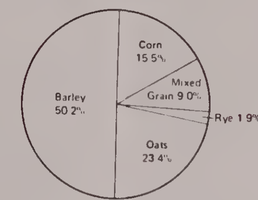
6. The Maritimes, Quebec and British Columbia are deficit feed grain areas and the Prairies are a surplus feed grain area.

7. There has been an upward trend in the production from the four secondary industries of brewing, distilling, feed manufacturing and flour and breakfast cereal. Value added in 1974 was $1.2 billion.

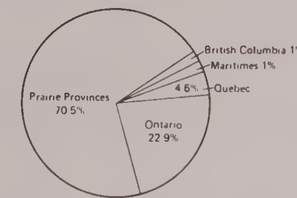
8. Exports of barley represent Canada's major non–wheat cereal grain export. Export of Canadian barley during the 1968–69 to 1972–73 period accounted for 28.4 percent of the total world exports of barley.

9. United States corn occupies a dominant place in international markets of non–wheat cereal grains.

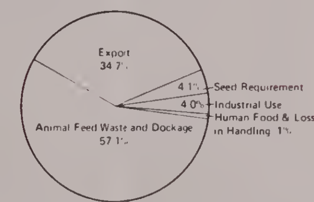
FARM VALUE OF PRODUCTION
VALUE $1,353 9M



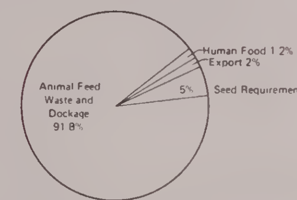
FARM VALUE OF PRODUCTION
VALUE $1,353 9M



OISPOSITION OF BARLEY PRODUCTION
ANNUAL USE-10 6M TONNES



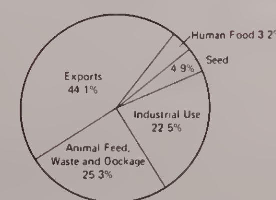
OISPOSITION OF OATS PRODUCTION
ANNUAL USE – 5.2M TONNES



OISPOSITION OF CORN SUPPLY
ANNUAL USE-3.4M TONNES

SOURCE OF CORN SUPPLY
ANNUAL SUPPLY-3 4M TONNES

OISPOSITION OF RYE PRODUCTION,
1970-74 AVERAGE
ANNUAL USE-0 4M TONNES



M = Million

17. THE CANADIAN NON-WHEAT CEREAL SYSTEM

17.1 THE PRIMARY SECTOR

Production of 'non-wheat cereal grains' as a group is generally as large as wheat, (Table 17.1) and for the 1970-74 period exceeded it by 52 percent.

Barley and corn for grain production have increased significantly, but oat production has been decreasing, and mixed grains have had only a modest increase. The main grain in this group since about 1965 is barley. Oat production is second, corn third, followed by mixed grain. Rye has always been of minor relative importance (Figure 17.1 and 17.2).

Barley production has increased steadily to 10.5 million tonnes per year in the 1970-74 period. This resulted from an increase in demand for coarse grains suited to animal production, a build-up of wheat stocks on the farm and in commercial channels, a decrease in the wheat price relative to feed grains, technological changes and government policies designed to diversify prairie grain production away from a wheat specialty farm economy.

17.1.1 Regional Variations

Approximately 95 percent of the barley is grown in the prairie region (Table 17.1 and Figure 17.3), although there is a variation between provinces as to its relative importance, being more important in Alberta (45 percent) than in the other provinces. There are differences in land use between provinces, as well as in soil zones (for descriptions of soil zones see Chapter 16). Approximately 65 percent of the barley is grown in the Black and Grey Soil Zones in contrast to only 35 percent of the wheat.

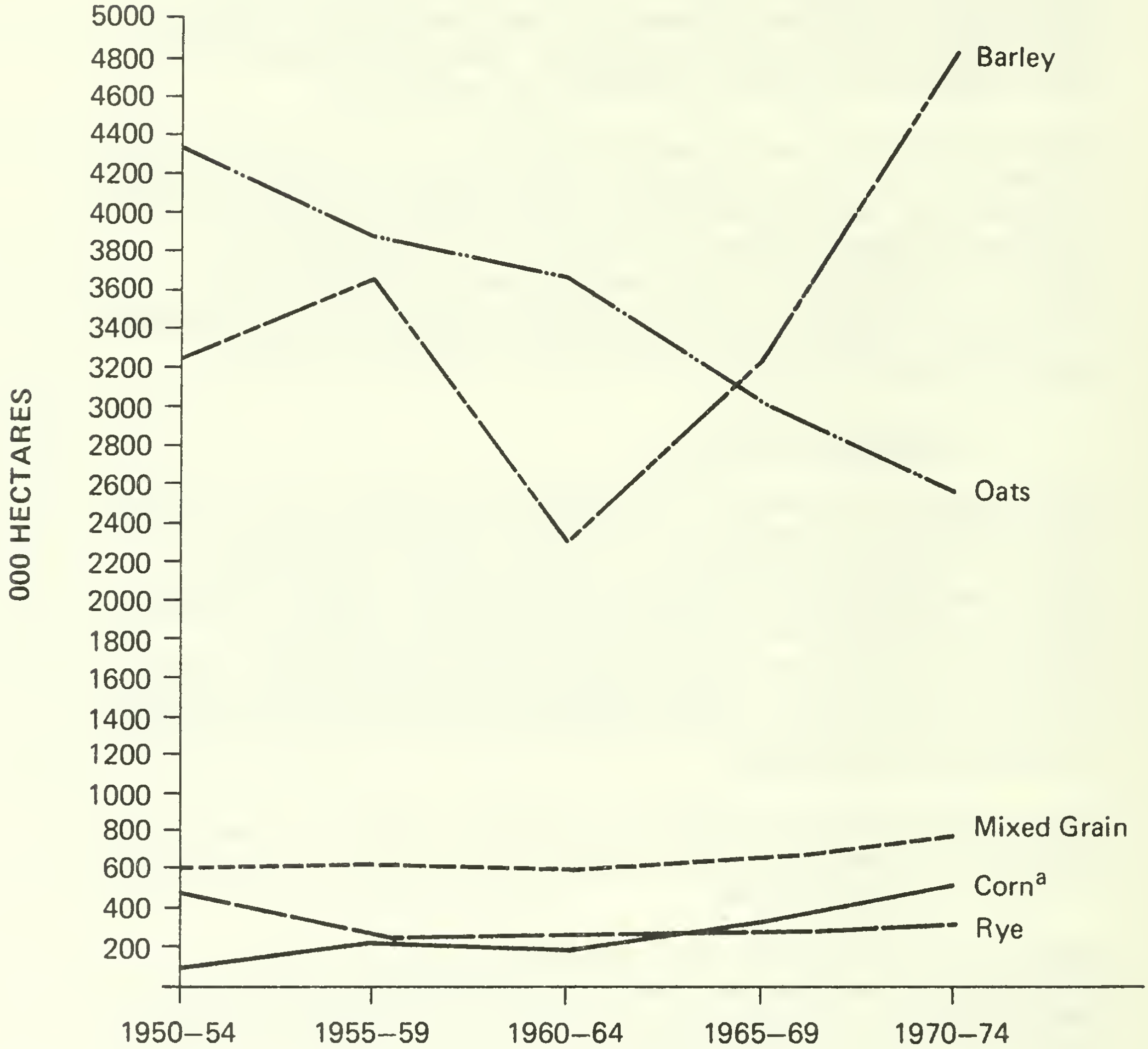
Oats is the next most important non-wheat cereal. However, the oat area has been declining in all regions, but not production in the Prairie Provinces.

Area and production of corn for grain has been increasing significantly in Ontario, the main corn producing area. If the trend continues, corn for grain will soon be the second most important non-wheat cereal crop. In Central Canada, it is used mainly as a feed grain in livestock rations.

There has been a fairly gradual increase in mixed grain production since 1960. It is the most important feed grain produced in the Maritimes and is also important in Ontario.

The full importance of these grains to the economy and to agriculture is not fully recognized if expressed in terms of total farm cash receipts since much of this grain is used for livestock feed. The contribution of non-wheat cereal grains to

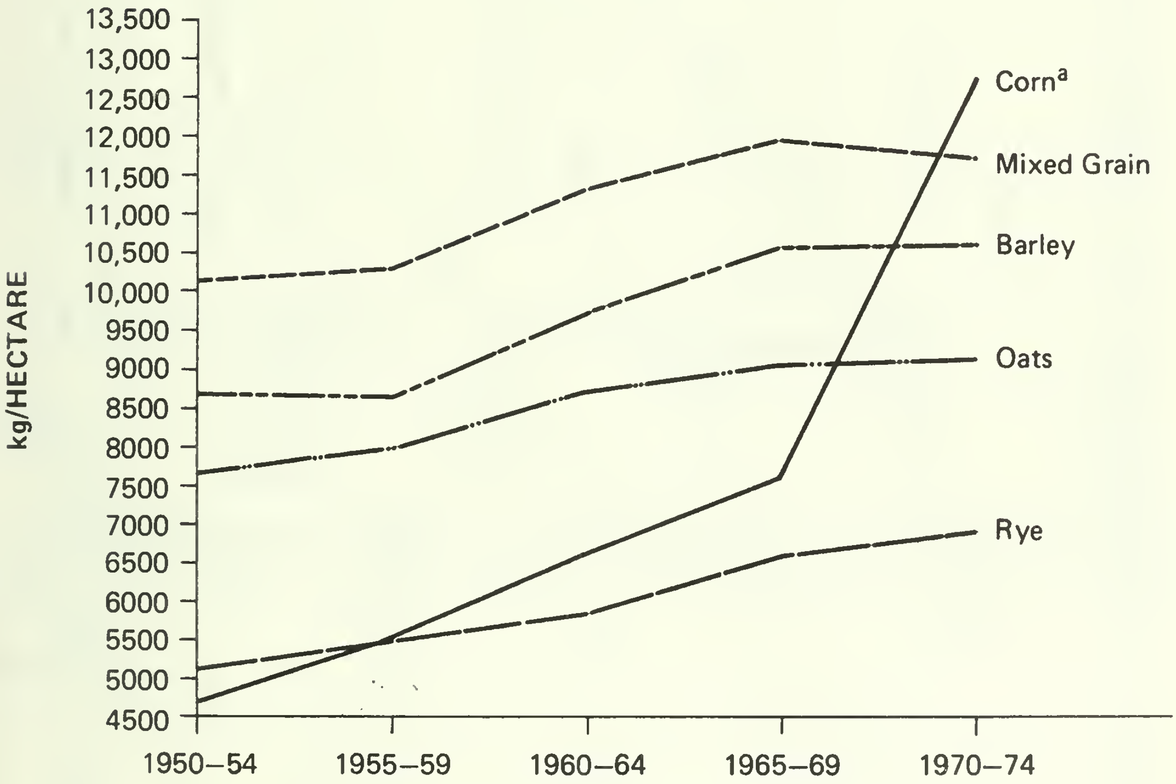
FIGURE 17.1 **SEEDED AREA OF BARLEY, OATS, CORN, MIXED GRAIN AND RYE, FIVE-YEAR PERIOD ANNUAL AVERAGES, CANADA, 1950 to 1974**



[a]Corn — 1950–69, Ontario and Manitoba only,
— 1970–74 Quebec included.

Source: Statistics Canada, Cat. 21–516.

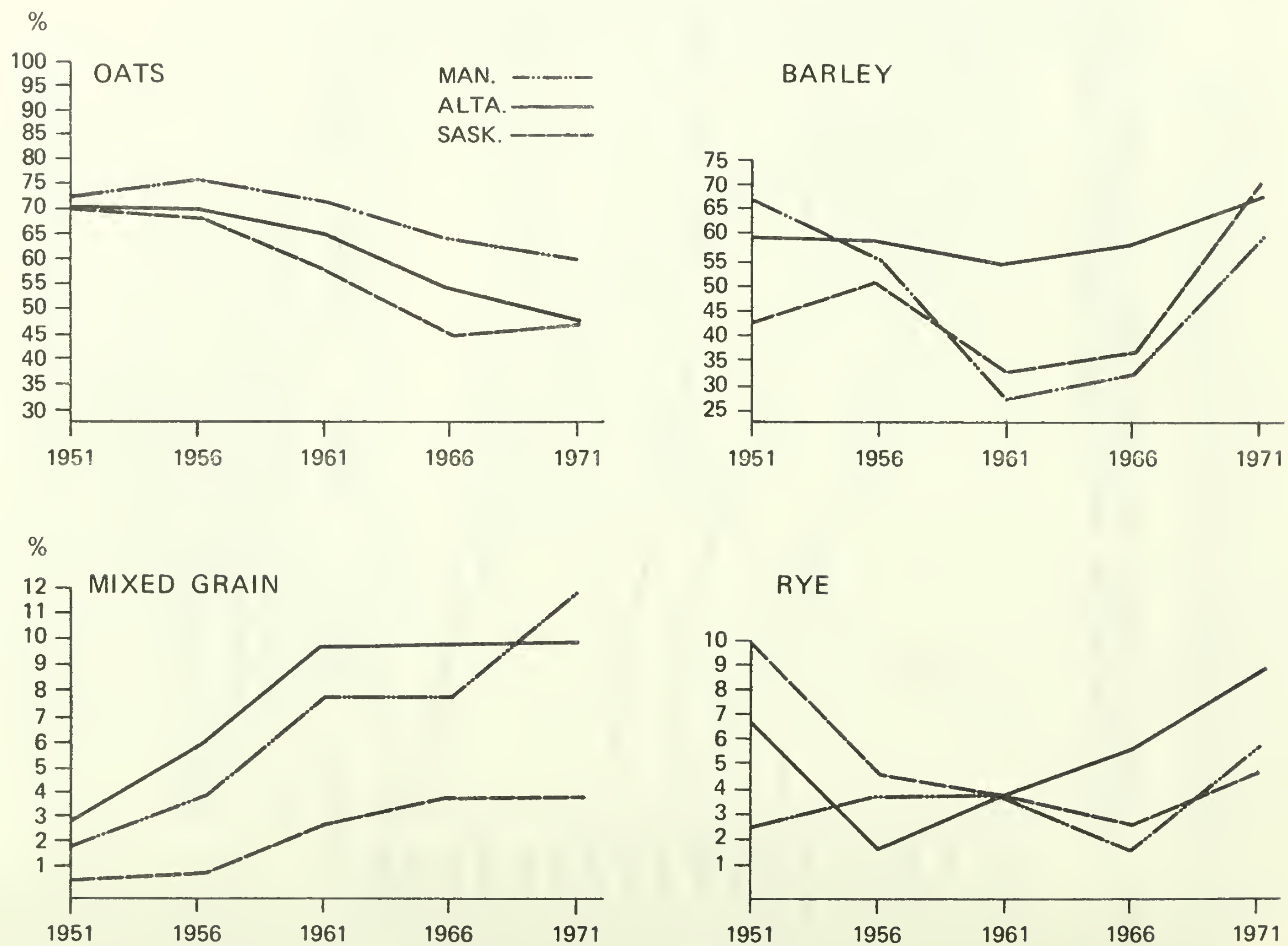
FIGURE 17.2 **YIELD OF BARLEY, OATS, CORN, MIXED GRAIN AND RYE, FIVE-YEAR PERIOD ANNUAL AVERAGES, CANADA, 1950 to 1974**



[a]Corn – 1950–69, Manitoba and Ontario only
– 1970–74 Quebec included.

Source: Statistics Canada, Cat. 21–516.

FIGURE 17.3 PERCENT OF FARMS WITH OATS, BARLEY, MIXED GRAIN AND RYE IN MANITOBA, SASKATCHEWAN AND ALBERTA, CENSUS YEARS 1951 to 1971



Source: Statistics Canada, Cat. 21–516.

Table 17.1 LAND USE PRODUCTION AND FARM VALUE OF PRODUCTION OF BARLEY, OATS, CORN, MIXED GRAIN AND RYE, BY REGION, CANADA, 1970-1974 AVERAGE (CROP YEARS)

Region	Crop					
	Barley	Oats	Corn	Mixed Grain	Rye	Total
			- 000 hectares -			
Maritimes	17	48	-	35	-	100
Quebec	17	278	52	49	1	397
Ontario	145	235	490	355	21	1,246
Prairie Provinces	4,619	2,051	4	358	293	7,325
British Columbia	70	28	-	3	1	102
Canada	4,868	2,640	546	800	316	9,170
			- 000 tonnes -			
Maritimes	37	84	-	87	-	208
Quebec	30	386	248	90	1	755
Ontario	388	473	2,440	1,039	37	4,378
Prairie Provinces	9,872	3,930	12	771	405	14,990
British Columbia	132	57	-	7	2	198
Canada	10,460	4,930	2,700	1,004	445	20,529
			- $000 -			
Maritimes	2,523	5,695	-	5,124	-	13,342
Quebec	2,529	30,819	22,324	7,165	73	62,910
Ontario	27,538	32,811	187,087	63,614	2,156	313,206
Prairie Provinces	645,020	246,568	2,293	46,295	24,229	964,405
British Columbia[a]	8,756	3,794		552	125	13,227
Canada	686,366	319,687	211,704	122,750	26,583	1,367,090

[a] Farm value of production not available for 1974. Price used in calculation was the 1965-69 price adjusted by the change in farm value price on the Prairie Provinces from 1965-69 period to 1970-74 period.

Source: Statistics Canada, Cat. 21-516.

farm receipts ranges from 28 percent for Saskatchewan to 40 percent for Alberta (Table 17.2).

17.1.2 Research and Technology

This has already been described under wheat (16.1.2).

17.1.3 Farm Level Pricing

Barley and Oats

Farmers have four basic ways of marketing these grains: (1) through a farm livestock enterprise; (2) sold commercially to another farmer or to a feed mill for resale within the region; (3) delivered to a country elevator and sold to the line elevator company; or (4) sold through the Canadian Wheat Board (CWB). The last option is the same as for wheat and is described in Chapter 16.

If the farmer sells non-board grain to a line elevator company, the company bases its price on a 90-day advance future price with deductions for handling, cleaning, freight, interest, storage, weighing, inspection and administration costs.

The CWB sells both on the export and domestic markets. It prices domestic sales at competitive rates with imported United States corn, by tying Canadian feed grain prices to the cost of United States corn at Montreal.

Rye

Rye is sold to country elevator companies in the same way as non-board oats and barley, although some rye is sold directly to distilleries.

Corn

Ontario corn is purchased from the farmer mainly by country elevator companies at a price based on that of United States corn in Montreal less the cost of drying, handling, transportation and storage. Other factors which can influence it are the competitive prices of western feed grains in the area, the local demand for high quality corn for industrial use, the supply of local corn, the amount of outstanding corn sales or corn purchases of the elevator operator, and the time of year and amount of other grains competing for elevator space.

17.2 THE SECONDARY SECTOR

17.2.1 Local Farm Utilization

Approximately 77 percent of the non-wheat cereal grains produced in Canada between 1970 and 1974 were used locally for animal feed and seed requirements. Essentially all of the feed

Table 17.2 SUPPLY AND DISPOSITION OF BARLEY, OATS, CORN AND RYE, CANADA, 1970-1974 AVERAGE

	Barley	Oats	Corn	Rye
		- 000 tonnes -		
Commencement Stocks in Store - July 31	4,035	1,693	124	307
Production	10,460	4,930	2,728	445
Imports	-	29	690	-
Total Supplies	14,495	6,652	3,542	752
Exports	3,662	102	18	190
Domestic Use				
Human Food	3	65	698[a]	14
Seed Requirements	431	257	15	21
Industrial Use	424	-	-	97
Loss in Handling	6	1	-	1
Animal Feed, Waste, Dockage	6,024	4,765	2,658	108
Sub-Total	6,887	5,089	3,371	243
Stock at End of Year - July 31	3,946	1,461	153	319

[a]Includes industrial use.

Source: Statistics Canada, Cat. 21-516.

grains produced in the Maritimes are utilized locally for livestock and poultry feed. The area is less than self-sufficient in feed grains, and the inward movement of an average of 343.3 thousand tonnes per year in the 1970-74 period accounted for more than 50 percent of their livestock feed requirements. In this period, average annual production of feed grains for use locally was estimated at 226.6 thousand tonnes, less the amount required for seed.

Small amounts of grain grown in Quebec enter the industrial and human market, but the majority of the grain produced in Quebec is used locally for livestock feed production. Assuming that five percent goes into industrial use and export, this leaves an average annual amount of 745 thousand tonnes, less seed requirements, of provincially-produced feed grains available for the 1970-74 period.

In Ontario, an average of approximately 760 thousand tonnes of corn goes into industrial and human use, as exports to Quebec, and other countries. This left an annual average of approximately 3.6 million tonnes, less seed requirements, available for use by livestock and poultry in the province, although this could have varied up to 4.3 million tonnes depending on the replacement of Ontario corn by United States corn for industrial and human use.

In the Prairie Provinces, it is estimated that an average 4.5 million tonnes of oats are used annually on farms, as well as 5.5 million tonnes of barley. Estimated use of rye in livestock feeding on the prairies is 245 thousand tonnes, bringing the total of all feed grains to approximately 10.3 million tonnes. Up to 3.0 million tonnes move through commercial channels in the prairies and back to the farms for use as livestock feed.

Essentially all feed grain produced in British Columbia goes into local feeding of livestock. In the 1970-74 period, this averaged 262.3 thousand tonnes, less seed requirements. Less than fifty percent of that required for livestock was produced locally, and an average of 320.8 thousand tonnes per year was moved in under feed freight assistance.

17.2.2 Domestic Utilization - Industrial and Human

Utilization of barley for industrial and human consumption in Canada has expanded at a steadily increasing rate over the last 25 years. Average use amounted to 426.4 thousand tonnes in the 1970-74 period. The bulk of this was for industrial purposes, with a declining amount going directly into human consumption.

Use of oats has been minimal for industrial purposes, but disposition for human food has varied, and was an average of 65.5 thousand tonnes in the five-year period between 1970 and 1974.

Utilization of corn for industrial purposes and human consumption has more than doubled in twenty years to 698.0 thousand tonnes.

Use of rye increased by approximately 400 percent to an average of 109.3 thousand tonnes in the 1970-74 period. Approximately 88 percent of this was utilized for industrial purposes.

Although some yearly variation has occurred in the amount of oats used in feed manufacturing, there has been little overall change. However, utilization of barley has expanded by more than 145 percent in the same period. Use of rye in the feed manufacturing industry is small by comparison to other grains, averaging only 2.7 thousand tonnes in the 1970-72 period. Utilization of corn by the feed manufacturing industry has expanded by over 650 percent from 1950 to 1972, mainly in the last ten years.

Use of oats and barley by the flour and breakfast cereal industry has decreased substantially over the past 25 years.

Utilization of barley malt by the brewing and distilling industries has increased since 1950 from an average of 180.4 to over 299.1 thousand tonnes. Their use of rye and corn has also increased considerably (Table 17.3).

Production (shipments) from the four secondary industries of brewing, distilling, feed manufacturing and flour and breakfast cereals have all trended upward since 1950.

17.2.3 Structure of the Secondary Industry

In the industries of brewing, flour and breakfast cereals and feed manufacturing, the number of plants have decreased at a gradual rate from 1950 to the present time. The vast majority of the feed manufacturing plants are located in Ontario and Quebec (Table 17.4).

The number of employees in each industry and the value added as of 1974 are: distilling - 6,203 employees and $488.4 million in value added; brewing - 11,421 employees and $423.7 million in value added; flour and breakfast cereal - 4,861 employees and $132.8 million in value added; feed manufacturing (1972) 8,808 employees and $163.9 million in value added.

17.2.4 Interregional Movement of Grain for Livestock and Poultry Feed

Considerable amounts of oats, barley and rye are transported from the prairies to Eastern Canada and British Columbia for livestock and poultry feed under the feed freight assistance program administered by the Canadian Livestock Feed Board. In the 1974-75 crop year, this amounted to 1,358 thousand tonnes.

Table 17.3 UTILIZATION OF CEREAL GRAIN AND PRODUCTS BY DOMESTIC INDUSTRY, CANADA, 1970-1974 AVERAGE

	Barley	Barley Malt	Oats	Corn	Rye
			- 000 tonnes -		
Feed Manufacturing	899.5a		440.2a	843.2a	2.7a
Flour and Breakfast Creal	6.3		70.7	74.2	11.7
Brewing		272.6		49.8	
Distilling		26.6		366.0	84.1

[a]Average of 1970, 1971, and 1972.

Sources: Statistics Canada, Cat. 32-204, 32,205, 32-206, 32-214, 32-215, and 32-288.

Table 17.4 SECONDARY INDUSTRY STRUCTURE, NON-WHEAT CEREALS, CANADA, 1974

	Maritimes	Quebec	Ontario	Prairies	British Columbia	Canada
			- number of plants -			
Feed Manufacturing	36	257	226	151	30	700
Flour & Breakfast Cereal	1	7	23	17	1	49
Brewing	8	3	11	16	6	44
Distilling	2	8	12	4	5	31

Source: As for Table 17.3.

Barley has approximately doubled its movement in the period since 1950-51, while oats and rye have declined.

The amount of corn moved under feed freight assistance has increased substantially and in 1974-75, 76.6 thousand tonnes of corn were transported interregionally under feed freight assistance. Virtually all of this originated in Ontario and was moved to Quebec and the Maritimes.

Grain produced on the prairies and moving to Eastern Canada generally is transported by rail to Thunder Bay, by water to eastern transfer elevators, and then out to the point of use, although each year some feed grain is railed direct from the prairies to Eastern Canada. Grain moving into British Columbia is generally railed to the point of use.

The region which obtains the greatest amount of feed grain from outside the province is Quebec. Of an average of 2.64 million tonnes of feed grains moved under feed freight assistance in the period 1970-74, Quebec received 1.32 million tonnes per year. In comparison, 0.66 million tonnes went to Ontario, 0.10 million to New Brunswick, 0.18 million to Nova Scotia, 0.04 million to Prince Edward Island, .04 million to Newfoundland and .32 million to British Columbia.

17.3 INTERNATIONAL TRADE

17.3.1 Exports

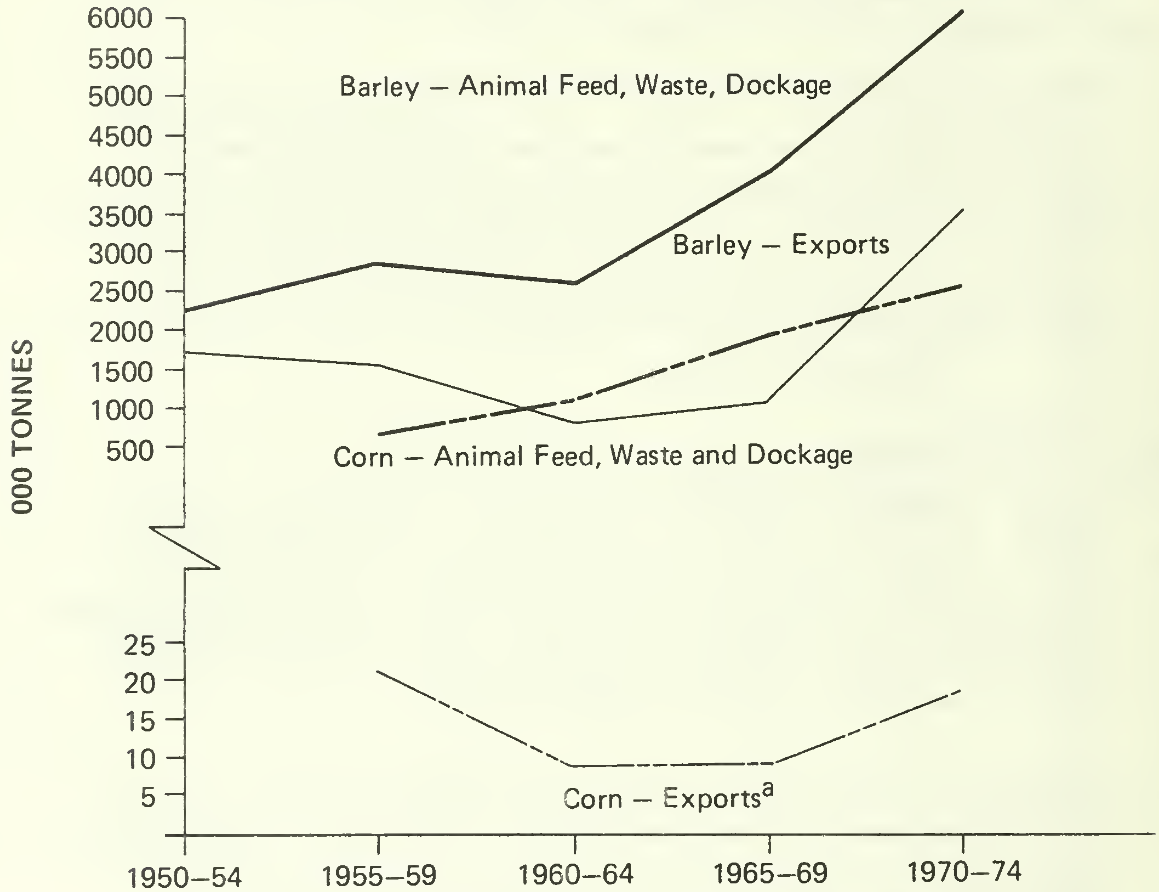
Barley represents Canada's major coarse grain export, approximately 3.7 million tonnes in the 1970-74 period (Figure 17.4). Most European countries occasionally import Canadian barley, but the United Kingdom is the most regular European buyer. The Netherlands, West Germany, Italy and Ireland are also frequent customers. Japan is a major importer and the United States is also a consistent buyer of Canadian barley.

Exports of coarse grains produced in Canada have varied considerably over the 25 years between 1950 and 1974. Exports of oats averaged 102 thousand tonnes in the 1970-74 period. The main importers of Canadian oats have been European countries, especially the United Kingdom, Switzerland, Ireland, West Germany and Belgium.

Exports of corn have been small relative to imports, and tend to occur in abnormal situations.

Rye exports have not varied over the 25-year period as much as the exports of other coarse grains. Rye has historically gone to the United Kingdom, the United States, the Netherlands, Japan and Venezuela. However, in recent years, Belgium, Luxembourg, West Germany and Norway have also been regular importers.

FIGURE 17.4 **EXPORTS AND ANIMAL FEED, WASTE AND DOCKAGE FOR BARLEY AND CORN, FIVE-YEAR PERIOD ANNUAL AVERAGES, CANADA, 1950 to 1974**



[a]Corn – 1950–54 n.a.

Source: Statistics Canada, Cat. 21–003.

Exports of oatmeal and rolled oats have declined steadily to only 0.2 thousand tonnes in the 1971-75 period.

Exports of another major product, barley malt, has generally increased since 1950 to an average of 127.6 thousand tonnes for the 1970-74 period.

Canada has also exported complete feeds for livestock and poultry, brewery products and distilled products. Animal feeds have gone to the United States historically, but with increasing amounts going to Japan in more recent years. Exports of Canadian whiskey and beer have gone mainly to the United States.

17.3.2 Canada's Competitive Position

The major competing grain for coarse grains produced in Canada is corn from the United States, and its supply-demand balance is the major determining factor of coarse grain price levels in international markets. In the ten-year period 1963-1972, exports of United States corn accounted for 34.3 percent of total world exports of coarse grains.

World production of barley is increasing. In the 1974-75 crop year, total world production was estimated at 157.1 million tonnes. Canada's share of world production accounts for 5.5 percent. In 1973-74 and 1974-75, Canada's production stood third in the world behind the USSR and France.

Canada's importance in world barley trade is considerably greater than is evidenced by comparing production figures. Canadian exports during the 1968-1972 period accounted for 28.4 percent of total world barley trade. In terms of productivity, the average yield of barley in Canada has been higher than the world average. The main importers of Canadian barley are Japan, Italy, West Germany and the United Kingdom. In addition, considerable quantities of Canadian barley move into the United States each year. Since 1971-72, it has also been exported to Eastern European countries.

World production of oats has declined slightly in recent years, and was approximately 50.2 million tonnes in 1974-75. Canadian production of oats ranks third in the world behind that of the USSR and the United States. Canada's share of world production in 1974-75 was 7.8 percent. The yield of oats in Canada exceeds the world average, but is less than that obtained in the EEC and Eastern European countries.

World production of rye has remained relatively constant for several years at about 32.7 million tonnes. Canada's share of this in 1974-75 was 1.5 percent. Production of rye in the world is concentrated in West Germany, Eastern Europe and the USSR, with the latter as the single largest producer. These countries account for about 85 percent of the world rye production. Canada's share of world trade of rye has declined in recent years to 19.7 percent in the three-year period from 1971 to 1973. In terms of yield, Canada is below the world average.

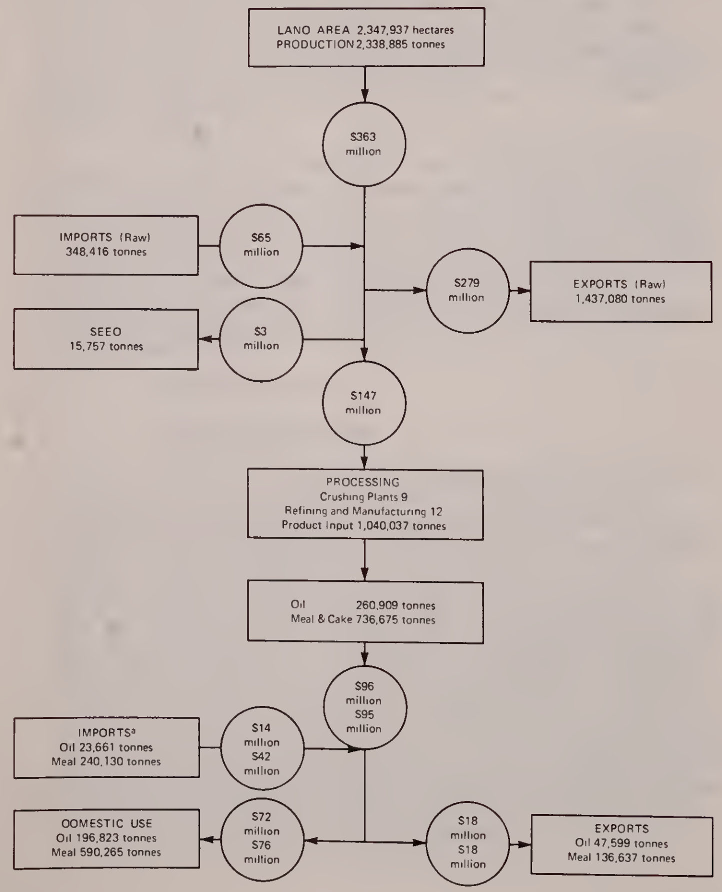
World production of corn has increased since the early 1960's, and for 1974-75 was estimated at 279.1 million tonnes. The dominant producer of corn is the United States, accounting for nearly half of the world production. Canadian production accounts for less than one percent. In terms of productivity, Canada's average yield of corn in the ten-year period from 1964 to 1973 equalled that of the United States, and was more than double the world average. Other than the United States, major exporters of corn are Argentina, France and Thailand, and in comparison Canadian exports of corn are extremely small at less than a tenth of one percent.

As the United States occupies a dominant role in international markets for coarse grains, it is appropriate to examine that country's policies which have an impact on production and world trade. The major United States production policy is that of stabilizing, supporting, and protecting farm income and prices, while assisting in the maintenance of balanced and adequate supplies, and facilitating the orderly distribution of agricultural commodities. Programs to support and protect farm income are the loan support and purchase program administered by the Commodity Credit Corporation. Production adjustment programs have been used to balance supplies with demand.

The major program used throughout the late 1950's and 1969's to assist in balancing supply with demand was the cropland set-aside program. Under this program, the base area of feed grains was determined as the average area of feed grains produced in 1959 and 1960. Each year, the percentage of cropland which must be set aside was announced. Since 1973, there have been no restrictions on area produced.

Where trade is concerned, the United States follows the policy of maintaining its traditional export markets and maximizing exports on commercial terms. The United States maintains import tariffs on all coarse grains.

THE CANADIAN OILSEED SYSTEM
1975



[a] Domestic production and imports of oil and meal minus domestic use and exports leaves $63 million unaccounted for. Inventory could account for part of this imbalance, but most must be attributed to data being obtained from several sources. The oilseed data base is not sound.

O E. Oil Equivalent
T Thousand

1. Oilseed production involves about 2.2 million hectares, of which 90 percent are on the prairies. Only soybeans are grown commercially east of the lakehead, namely in Southwestern Ontario. Canadian flax and rapeseed account for 18 6 and 20.5 percent of world productinn, respectively. Rapeseed, sunflower and flax production satisfies domestic markets for seed, oil and meal; soybean production meets only 50 percent of Canadian needs

2. Oilseeds are crushed at ten plants, the total capacity of which is 1.6 million tonnes per 250 day year. However, only about 60 percent of this capacity is used regularly. Four of the seed crushers also refine the nil, and five other companies only refine oil. Canada has about 16 major manufacturers of oil–containing foods.

3. Oilseed crops return about $360 million to producer at least five times the value of imported seed. Canadian oilseed exports, about $280 million, are more than four times the value of imported seed. The Canadian oilseed crushing industry represents a capital investment of about $120 million and employs about 650 people.

4. Oilseeds are traded on the open market with prices determined internationally. Our major exports are rapeseed and flaxseed and our major imports are soybeans and soybean oil and meal. Over 50 percent of Canadian oilseeds are exported and this contributes approximately 11 percent of the value of Canada's agricultural export trade.

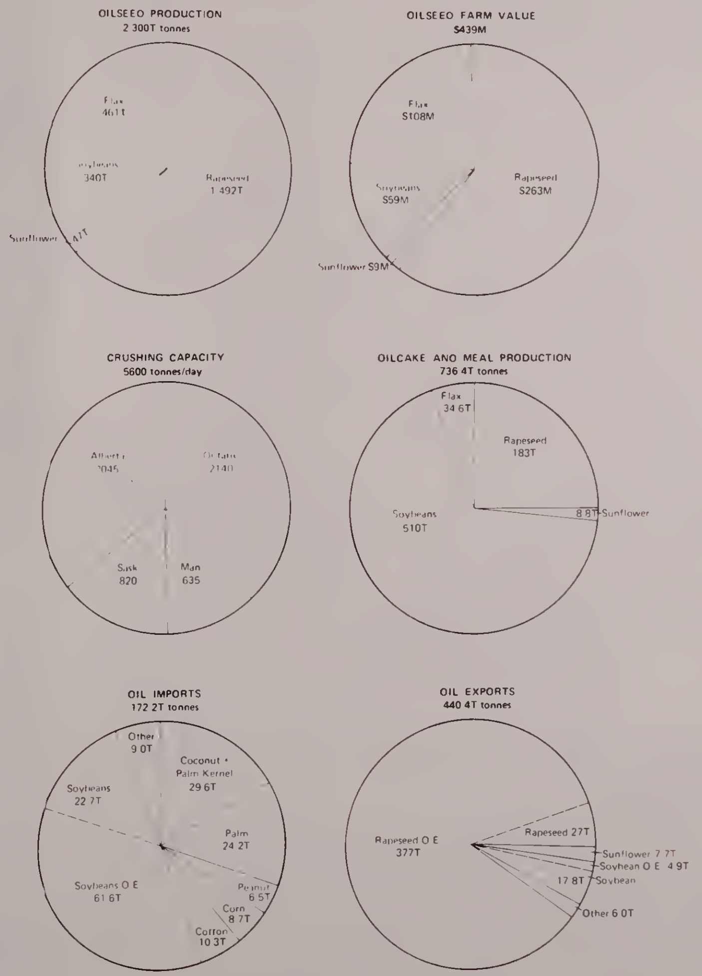
5. The oilseed meal is a valuable source of energy and protein for livestock. Domestically crushed vegetable oil has markedly reduced Canada's dependence on imported seed or oil, while the oilseed meal produced as a by–product has become a source of protein for the Canadian livestock industry.

6. Total federal government annual expenditure on programs for oilseeds and their products is estimated at $6 million, provided by six departments. Agriculture Canada's annual investment in oilseeds research is about $3.2 million.

7. Oilseed production has increased markedly in the past 20 years; sunflower, soybeans and flax have enjoyed a three–fold increase in area and rapeseed a sixteen–fold increase. The average unit yield has increased by 14–40 percent.

8. Plant breeding has produced rapeseed cultivars low in both erucic acid and glucosinolates and of lower hull content, as well as soybeans that mature and yield well in cooler regions.

9. Research to reduce crop losses from insect and disease attack, competition from weeds and the impact of climatic limitations, continues to improve the competitive position of oilseeds.



18. THE CANADIAN OILSEED SYSTEM

18.1 INTRODUCTION

Canada produces and crushes four oilseed crops of which three are for the edible oil trade. Mustard, for the purpose of this report, is classified as a condiment and is described under Other Crops. Rapeseed, sunflower and soybeans yield oils that serve as valuable sources of calories in the human diet. Salad and cooking oils, mayonnaise and other dressings, shortening and margarine are examples of commonly consumed fat-based products. The protein that remains after oil extraction is used by the feed industry. These meals or oilcakes, including linseed meal, provide nutritious and economical protein for animal feeding. Modest amounts of oilseeds are also fed directly, without oil extraction, to animals as high energy sources of protein. Another small proportion of the protein is used to make pet foods and milk replacers for young ruminant animals. Oilseeds, therefore, are important to the Canadian livestock industry.

Production, consumption and export data show clearly that each of the oilseeds (rapeseed, soybeans, sunflowers and flax) has its own patterns which reflect the impact of many variables, especially competition for land from other crops, e.g., wheat and corn. Operation LIFT in 1970-72 demonstrated that oilseed production increases when economic conditions permit. In addition, it is clear that the value of oilseed crops is a significant component of the primary and secondary sectors of Canadian agriculture.

18.2 THE PRIMARY SECTOR

18.2.1 Production Variations

Oilseed production in Canada has varied greatly over the last twenty years. Production of soybeans (Figure 18.1) has increased more than threefold since 1950 to the level of an average of 339,560 tonnes for 1971-75. Production of flaxseed (Figure 18.2) has fluctuated widely from a low of 127,007 tonnes in 1950 to a high of 1,218,399 tonnes in 1970, but in the most recent five-year period (1971-75) has declined to an average of 460,800 tonnes. Rapeseed is a relatively new crop, with limited production prior to 1950. Rapeseed production (Figure 18.3) gradually increased up to 1971 when, influenced by the LIFT program in 1970, it reached a peak of 2,154,214 tonnes. Since then production has declined to 1,748,600 tonnes in 1975 and further to 929,900 tonnes in 1976. Sunflowerseed is also a relatively new commercial crop for the prairies, but was produced before the 1950's. Production increased (Figure 18.4) to an average of 46,648 tonnes in 1971-75, peaking in 1971 and 1972 at 76,694 and 77,115 tonnes.

FIGURE 18.1
SOYBEAN PRODUCTION & DOMESTIC DISAPPEARANCE, CANADA, 1950 to 1975

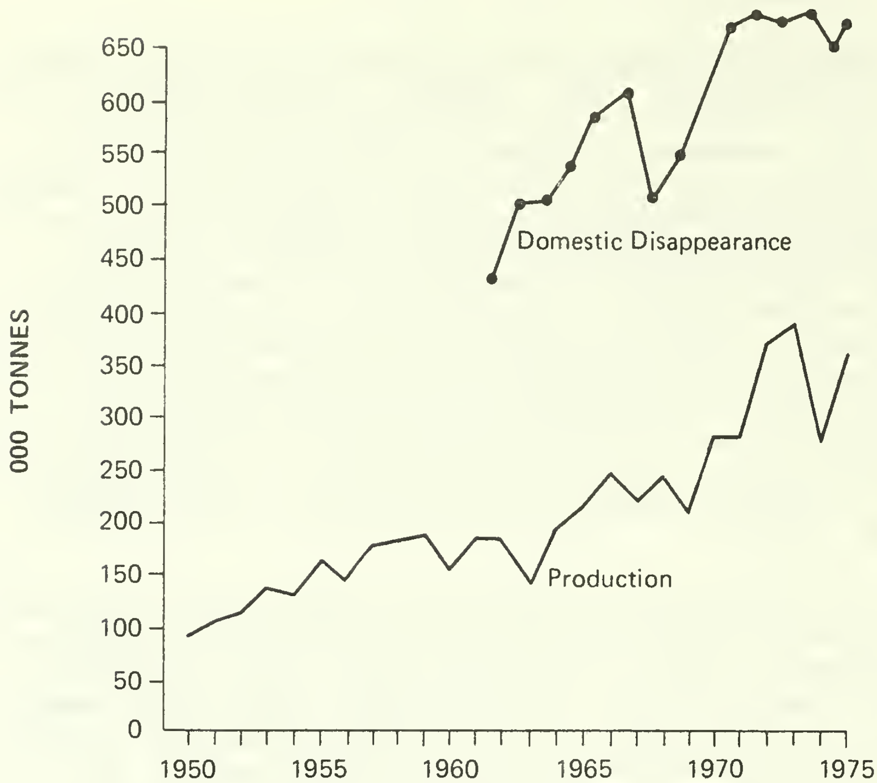
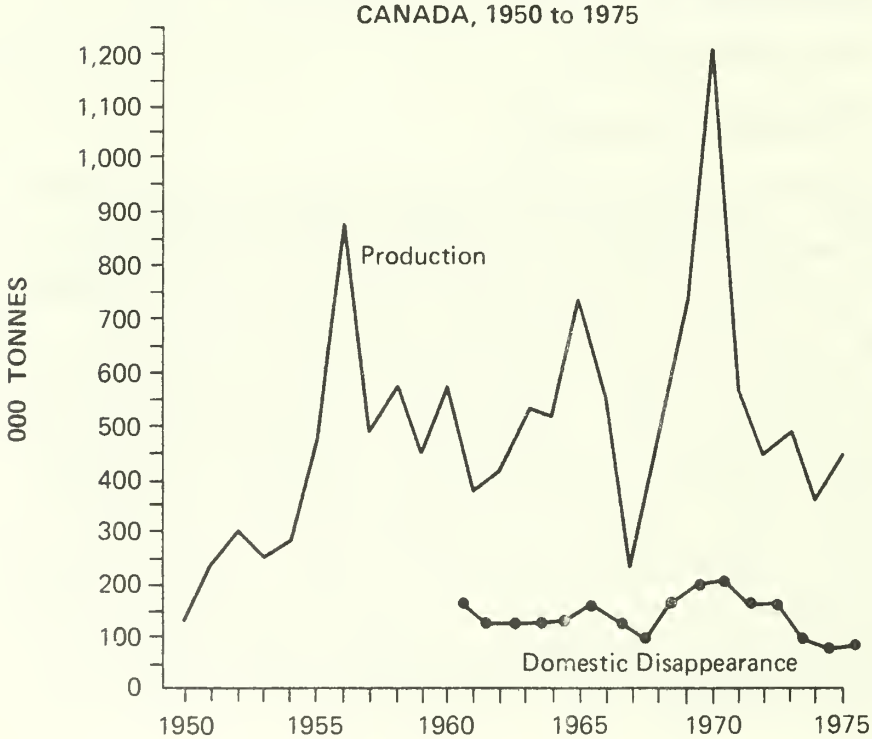


FIGURE 18.2
FLAXSEED PRODUCTION & DOMESTIC DISAPPEARANCE, CANADA, 1950 to 1975



Source: Statistics Canada, Cat. 22–002 & 22–006.

FIGURE 18.3

SUNFLOWERSEED PRODUCTION, CANADA, 1950 to 1975

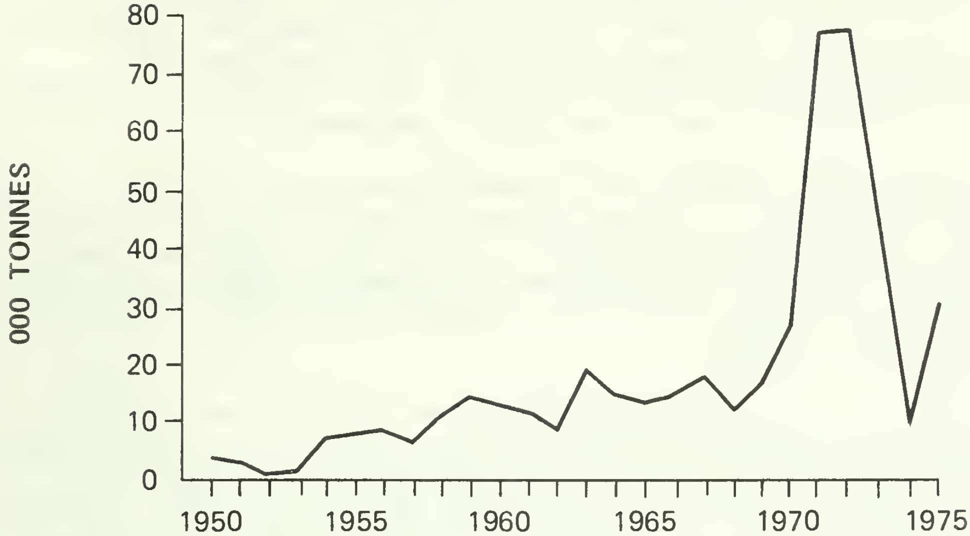
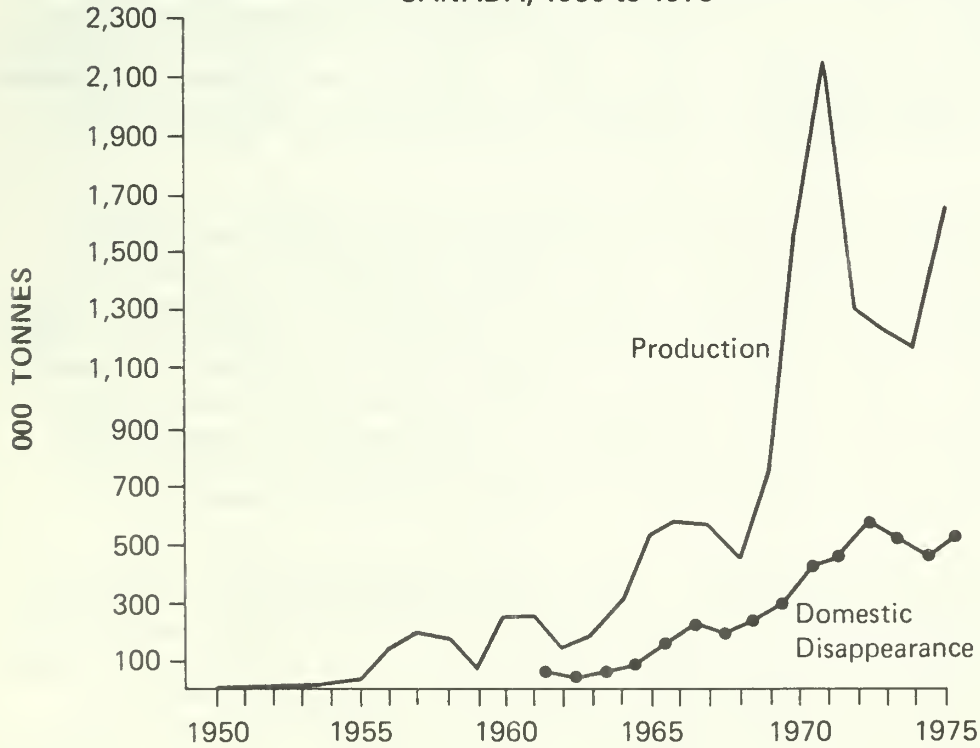


FIGURE 18.4

RAPESEED PRODUCTION & DOMESTIC DISAPPEARANCE, CANADA, 1950 to 1975



Source: Statistics Canada, Cat. 22–002 & 22–006.

The major factor underlying fluctuations in oilseed production has been the variation in area planted (Table 18.1). The total for the four oilseed crops increased nearly fourfold from 1950 to 1975 to an average of 2,348 thousand hectares in the period 1971-75. In addition, average yields of each of the oilseed crops improved over the same time interval. The greatest increase was in soybeans which averaged 41 percent higher in the period 1971-75 than in 1951-55. There was also an improvement of 27 percent in the yield of flaxseed, 19 percent in sunflowerseed, and 14 percent in rapeseed.

Virtually all flaxseed and rapeseed production is in the Prairie Provinces. Flaxseed tends to be planted in the dark brown soil zone and rapeseed in the Northern Prairies (black and grey soils). Sunflowerseed is produced mainly in Southern Manitoba. Essentially all the soybean production is in Southwestern Ontario.

In 1971, 13.9 and 27.9 percent of the farms in the prairies produced flaxseed and rapeseed respectively, with five percent of Manitoba farms given to sunflower production (Table 18.1). This high percentage of farms producing oilseeds was a result of the LIFT program. In Ontario, eight percent of the farms produced soybeans.

18.2.2 Research and Technology

To reduce disease and insect losses, rapeseed should not be placed in the rotation more than once every three years, and other crops in the rotation should not be susceptible to the same diseases or insects (e.g., potatoes, sunflowers, mustard and sweet clover). As a result, much of the rapeseed is seeded on summerfallow. In 1969-73, 78 percent of the area sown to rapeseed had been summerfallowed the previous year.

The potential yield of rapeseed is much higher than for flaxseed, even though the average for the prairies is much below its potential. It is fairly consistent at about 950 kilograms per hectare, with a high variation from farm to farm within any one year. Dockage on rapeseed and flaxseed has been very high at 10-12 percent, compared to 2-3 percent for wheat, due to inability of these crops to compete with weeds. The yield potential of flaxseed is lower than for rapeseed, but while deviations from year to year are large, farm-to-farm variation in any one year is less than for rapeseed.

Sunflowers are highly susceptible to diseases, even when the fields are scattered. It is much more susceptible to disease than rapeseed. Flax and soybeans are not attacked severely by insects. In contrast, the larvae of a number of insects attack sunflowers specifically, and loss from the sunflower leaf beetle and the sunflower moth can be severe. However, these losses tend to be localized. Rape seedling leaves are eaten by flea beetles and red turnip beetles, and the seedlings are cut

Table 18.1 OILSEED PRODUCTION, CANADA, 1971-1975 AVERAGE

CROP	PRODUCTION 000 tonnes	AREA 000 hectares	AVER. YIELD kg/ha	NO. OF FARMS PRODUCING	% OF TOTAL FARMS	AVER. FARM SIZE hectares
RAPESEED	1,492	1,530	968	48,888[a]	27.9[a]	44.9[a]
FLAX	461	598	771	24,382[a]	13.9[a]	29.5[a]
SOYBEANS	340	166	2,050	7,638[b]	8.0[b]	19.5[b]
SUNFLOWERS	47	54	915	2,516[a]	5.0[a]	47.5[a]
TOTALS	2,340	2,348		82,424	52.8	

[a]Average for prairies.
[b]Ontario only.

Sources: (1) Statistics Canada, Cat. 22-002.
(2) Statistics Canada, Census of Agriculture, 1971.

off at ground level by the red-backed cutworm. In addition, Bertha armyworm larvae can cause economic losses whenever the population becomes large.

Current soybean varieties require a sufficiently long growing season that this crop is limited to the warmer regions of Southern Ontario. Rapeseed production requires the use of two species (Brassica napus and Brassica campestris) one for the southern and mid-central prairies and another for more northern regions. Flax and sunflower also require the more moderate climates of the southern prairies, although one highly successful flax variety was developed for northern production. All plant breeding research involves selection for early maturity and considerable success has been achieved. In rapeseed, breeding has resulted in varieties with lower hull content and essentially free of undesirable components, and with soybeans in lines that mature and yield well in cooler regions.

18.2.3 Public and Private Services

In general, the federal government is responsible for developing appropriate science and technology to help the production, protection and utilization of crops and also for policies and regulations to assist income maintenance. The provincial governments cooperate in these efforts, with extension and regulatory work as their major responsibilities.

The Research Branch of Agriculture Canada conducts research on oilseeds at a number of stations across the country with emphasis at Saskatoon, Morden, Harrow and Ottawa where national as well as regional problems are studied. All aspects of production, protection and utilization research appropriate to oilseeds are investigated. The Economics, Health of Animals and Production and Marketing Branches, through headquarters and regional offices, analyze situations and develop policies and regulations relating to oilseeds. Agriculture Canada's New Crop Development Fund assists research on oilseeds as part of its program to help crops become established in new growing regions.

The Department of Industry, Trade and Commerce (IT&C) is concerned with both domestic and export markets. Through its Agriculture, Fisheries and Food Branch, Trade Commissioner Service and Grain Marketing Office, markets are investigated and opportunities exploited. Research to develop or expand markets for oilseeds is also supported by IT&C.

Producer organizations with a role in the oilseeds sector include the Rapeseed Association of Canada, Flax Growers Western Canada and the Ontario Soyabean Growers Marketing Board. The Rapeseed Association of Canada plays a major role in the promotion of Canadian rapeseed, both oil and meal and, in cooperation with IT&C supports research through the Rapeseed

Utilization Assistance Plan. Flax Growers Western Canada is a growers' committee that defines the problems affecting the flax industry and encourages support for research to enable producers to realize the maximum possible returns. The Ontario Soybean Growers Marketing Board annually negotiates a marketing agreement, and works to maximize potential returns from the marketplace.

18.2.4 Farm Level Pricing

All soybeans marketed in Ontario are sold under an agreement negotiated between the growers and processors which states that Ontario processors will pay no less for Ontario soybeans than the cost of equal-quality imported beans, whereas flaxseed and rapeseed are priced on the open market.

Options for the producer selling on the open market are: (1) sell upon delivery to the elevator at the street price quoted on the day of delivery; (2) contract for forward delivery with the further option of delivering on the contract, or delivering as in (1) and buying back the future delivery contract; (3) contract to deliver a fixed quantity; or (4) contract for all the production from a certain area, to be delivered in certain months at predetermined prices.

Sunflower seed pricing is dependent on the oil and meal markets. The majority of sunflower seed is grown under a contract with either the crusher or elevator company.

18.2.5 Farm Income

Farm cash receipts from oilseeds in relation to those from other crops have increased steadily since 1950 (Figure 18.5), to 11.8 percent of total crop receipts in the period 1971-75. Oilseeds now account for 5.1 percent of all receipts from agricultural production.

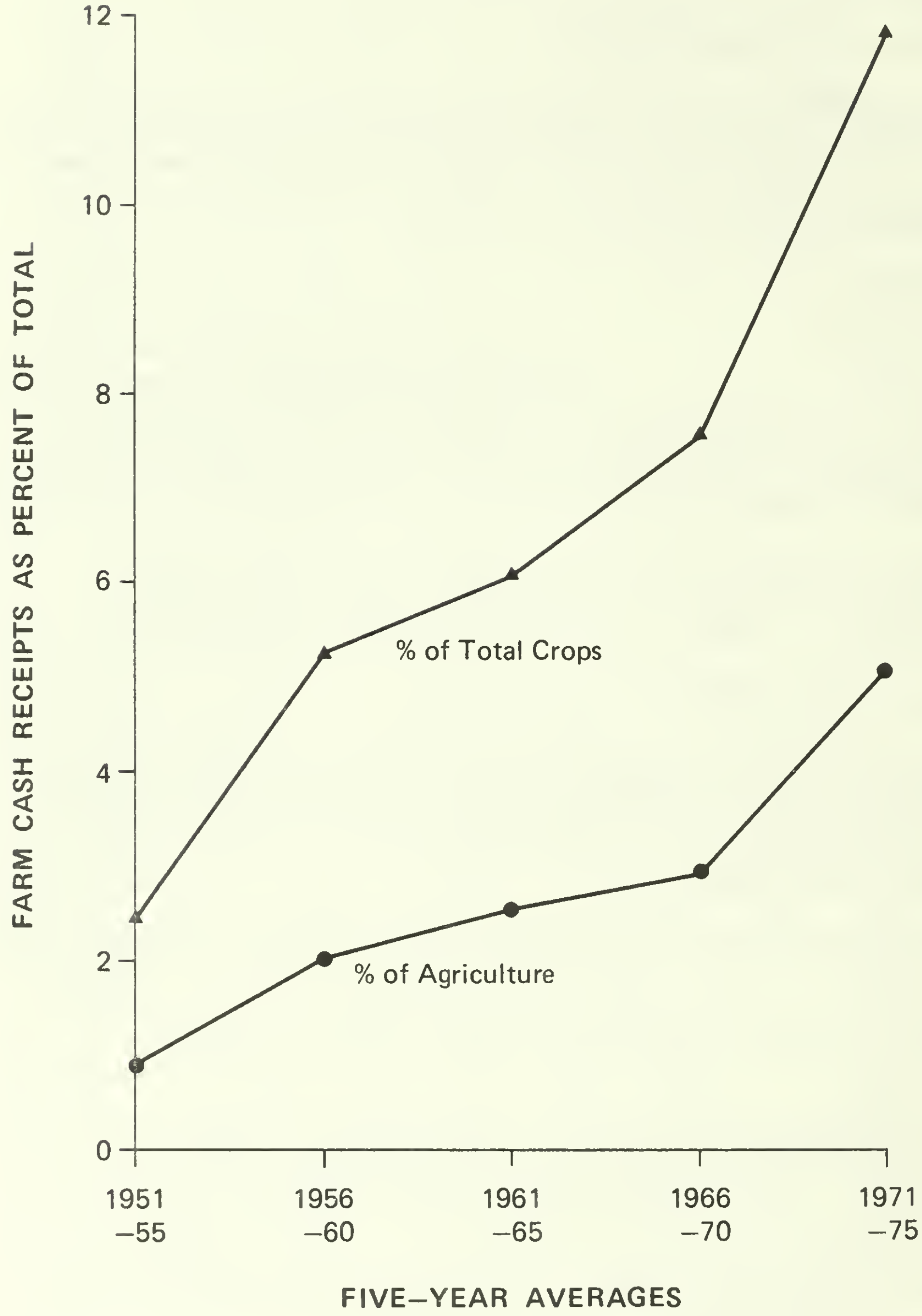
The importance of oilseed production is greatest in Ontario and the prairies. For 1974 and 1975, total receipts from flaxseed and rapeseed in the prairies averaged $400 million, and in Ontario average receipts from soybeans amounted to $60 million.

World oilseed prices have been influenced by a number of factors, including the recent major increase in palm oil production, most of which enters export markets. Once plantations are established, palm oil can be produced at a very low cash cost compared to oilseeds and, with oil yields of 4.5 tonnes or more per hectare, it strongly affects world markets.

18.2.6 Comparison with Other Countries

In the period 1971-75, Canada accounted for an average of 18.6 percent of the world flaxseed production, and 20.5 percent of the world rapeseed production. On the other hand, Canadian

FIGURE 18.5 **RELATIVE INCREASE OF OILSEED CROPS IN AGRICULTURE, CANADA, 1951 to 1975**



soybean production amounted to only an average of 0.6 percent and sunflowerseed accounted for only 0.4 percent of world production.

The major oilseed in terms of its total world production and impact on world trade is the soybean, of which the United States is the largest producer. In the three years 1973-5, United States exports constituted 56 percent of the world oilseed and oilseed meal exports. Of these, 98 percent were soybeans or soybean meal. The next country in terms of soybean exports was Brazil with 16 percent of world exports in those three years. Canadian rapeseed and rapeseed meal accounted for 1.4 percent of world oilseed and meal trade in that period.

Because United States soybean production is the largest factor in world production of oilseed and oilseed products, United States policies influence oilseed production in Canada. Their major production-oriented policy is the floor-price system which effectively sets a minimum price at which the government will purchase part of the crop. This has the effect of stabilizing production in years when market prices are poor. Since 1972, the floor price has not had any impact because it was far below market price, and in 1975 none was announced.

The other United States policy affecting Canada was the embargo on soybean exports which the United States Government imposed in late 1974 when the possibility of domestic shortages occurred. This embargo had the effect of maintaining world oilseed prices throughout late 1974 and into 1975 at a relatively higher level than would otherwise have been the situation.

18.3 THE SECONDARY SECTOR

18.3.1 The Industry's Products

For the purposes of this review, the secondary sector is defined as that part of the oilseeds system which is concerned with seed utilization, whether as seed for subsequent crops, whole or dehulled seed for feed use, or as raw material for the seed crushing industry. The secondary sector also embraces the oil, meal and oilseed by-products that result from the crushing, but this review does not cover the fabrication and marketing of edible or non-edible products. Rapeseed, sunflowers, soybeans and flax are treated individually.

Soybeans are the major world source of oil and meal. Soybeans and soybean oil accounted for 26.1 percent of world exports of oils and fats in the years 1973-75, of which 81.0 percent were from the United States. In those three years, palm oil, most of which originated in Malaysia and Indonesia, represented 10.8 percent of world exports of oils and fats.

Rapeseed oil and rapeseed exports in oil equivalents in those three years accounted for 5.8 percent of world exports. Based on 1973 and 1974 information only, 62.6 percent of exported rapeseed and 7.8 percent of the rapeseed oil exports were from Canada. The EEC was the next largest exporter of rapeseed and rapeseed oil.

18.3.2 Domestic Consumption

Domestic consumption includes the total disappearance through use of seed for planting, animal feed, dockage (removal of foreign seed) and losses in seed drying, handling, storage, or through fire, as well as seed crushed to provide oil and meal. Increasing rapeseed area has been reflected in increased seed use, whereas the seed demand for soybeans has remained essentially constant and that for flax has fallen. Total domestic consumption has increased for rape and soybeans and decreased for flax. Domestic disappearance in relation to Canadian production is shown in Figures 18.1, 18.2 and 18.3; sunflower production has been too small and variable to permit compilation of useful data.

The oilseed crushing data (Figure 18.6) show that the domestic crush of rapeseed has increased dramatically from a insignificant level prior to 1960 while the increase for soybeans has been consistent, smaller, but at a much higher total volume. Sunflower crushing has increased only slightly. Flax is now crushed at only two locations in Canada, most of it, instead, being exported as seed.

18.3.3 International Trade

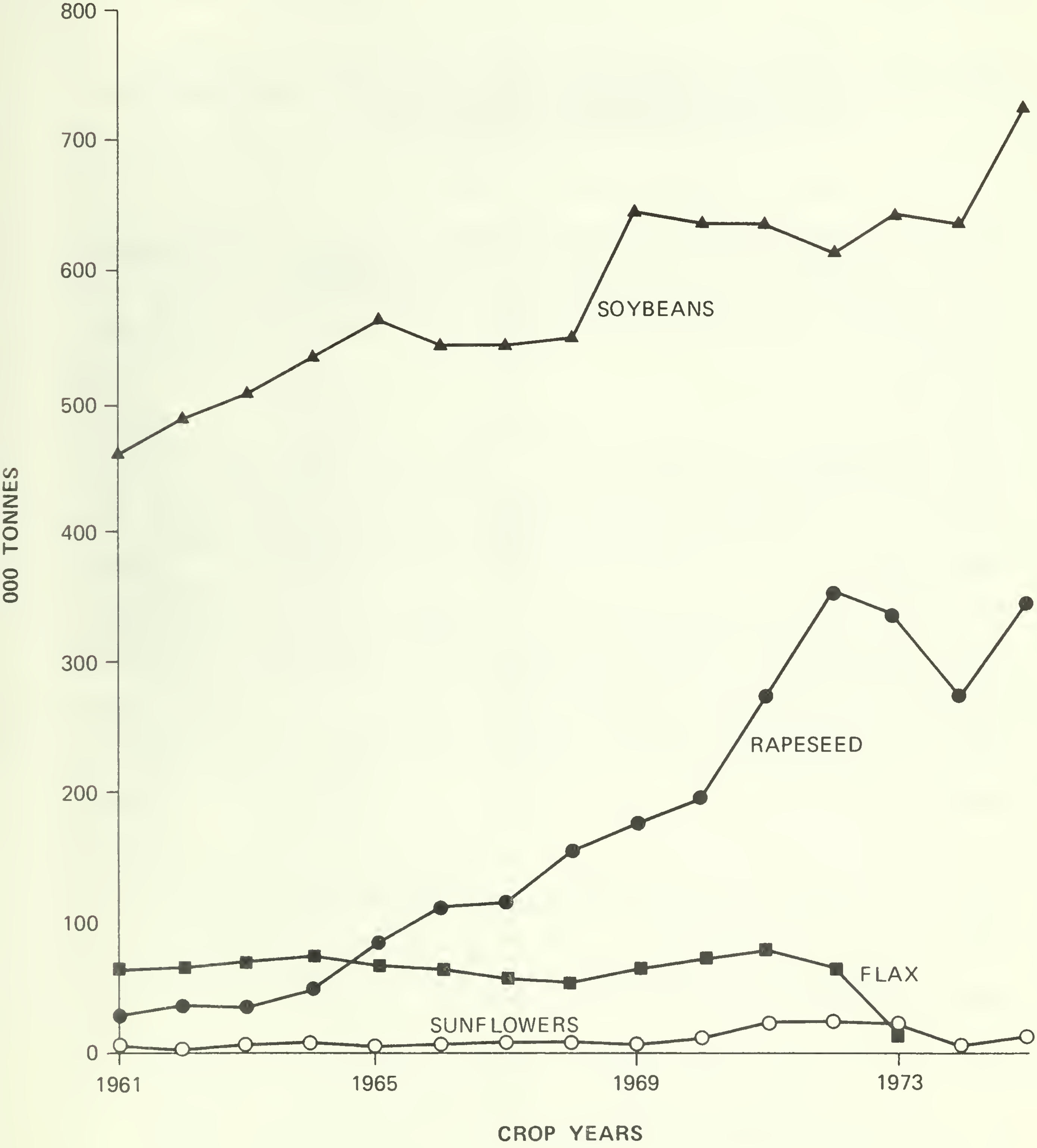
Oil Imports

Imported oils may be classified into exotic oils and those mainly of North American origin. The first category comprises coconut, olive, palm, palm kernel and peanut oils, and cocoa butter. These commodities are imported in part because their physical and chemical properties are needed in formulations and also because the price can be attractive. On the other hand, North American oils are generally imported because of their availability and price, although corn oil has a specialty status.

Commodities with specific uses, e.g., coconut and palm kernel oils and cocoa butter, are imported at a comparatively stable rate (Table 18.2). Relatively large purchases of coconut oil were made in 1972 and in 1975, and raised the 1971-75 average by almost 20 percent. A modest rise in olive and corn oil during the 1971-75 period probably reflects a buoyant economy as well as ethnic and health interest. A decline in cottonseed importation is probably the result of its relative unavailability, whereas a reduced use of peanut oil is related to its price.

Two oils have made marked gains in the 1971-75 interval. Soybean oil has recently been priced at a level below that of

FIGURE 18.6 **OILSEED CRUSHING, CANADA, 1961 to 1975**



Source: Statistics Canada, Cat. 22–006.

Table 18.2 CANADIAN IMPORTS OF EDIBLE FATS AND OILS, SELECTED FIVE-YEAR AVERAGES, 1951 TO 1975

Items	1951-55	1961-65	1971-75
		- tonnes -	
Coconut Oil	10,398	20,558	24,402
Olive Oil	875	1,444	2,312
Palm Oil	13,244[a]	10,050	24,157
Palm kernel oil		3,440	5,213
Peanut Oil	4,549	5,956	6,496
Coca Butter	2,254	5,494	5,850
Corn Oil	-	7,131	8,666
Cottonseed Oil	20,722	18,009	10,322
Sunflower Oil	1,768	-	942
Soybean Oil	9,023	12,198	22,719
Soybeans (Oil Equiv.)	26,610	74,993[b]	61,605

[a]Palm oil and palm kernel oil combined in 1951-55.

[b]1962-65 average.

Source: Statistics Canada, Cat. 65-007.

rapeseed oil, and a 76 percent increase in importation was the result. During this interval, palm oil imports increased 118 percent relative to the 1966-70 average as a direct result of the major increase in Malaysian palm oil production and the low cost of the product.

Palm oil merits separate comment because its price should continue to be the lowest of all vegetable oils. However, it is unlikely to capture more than double its present share of the northern hemisphere market (now about 10 percent), as its functional properties leave something to be desired. Nevertheless, in the formulation of some products such as shortenings and cooking fats, it could make major inroads.

In addition to the oils imported by name, there are those imported as 'margarine and shortening oils'. Over the past 15 years, an average of about 10,000 tonnes of this undesignated material has been imported yearly, ranging from 4,000 to 23,000 tonnes. Price would seem to be the main reason for this variable use.

Oil Exports

Whole seed export data, expressed as oil equivalents, (Table 18.3) show that soybeans have fallen off steadily since 1965 when a high of 14,606 tonnes was reached. Sunflowerseed exports have increased on a modest scale, while rapeseed exports increased sixfold between 1961 and 1975.

Soybean oil exports appear to have been relatively constant. However, the 1971-75 average value hides the fact that the exports range from a high of 44,229 tonnes in 1971 to a low of 2,074 tonnes in 1975. In contrast, the growth in rapeseed oil exports between 1969 and 1975 has been at a substantial level. The peaks in 1971 and 1972 probably reflect the impact of Operation LIFT, with trade returning to more normal levels in 1974 and 1975. Sunflowerseed oil movement has increased over the past 15 years.

18.3.4 Oilseed Meal and Cake

Canada produces substantial quantities of meal from rapeseed, sunflower, soybean and flax, which the Canadian feed manufacturers absorb to a large degree. However, an appreciable export trade also exists. At the same time, Canada imports cottonseed, soybean oilcake and meal, as well as meal and cake of unspecified origins.

Rapeseed meal exports in the past have been small (Table 18.4). However, in 1973, over 41,000 tonnes were exported and the three-year 1973-75 average export was 30,945, many times greater than previously. This reflects the increased volume of rapeseed production and also the marked expansion of Canadian rapeseed crushing capacity.

Table 18.3 CANADIAN EXPORTS OF EDIBLE FATS AND OILS, SELECTED FIVE-YEAR AVERAGES, 1951 TO 1975

Items	1951-55	1961-65	1971-75
		- tonnes -	
Soybeans (Oil Equiv.)	3,778[c]	11,887	4,941
Soybean Oil	d	16,853	17,823
Rapeseed (Oil Equiv.)	d	60,980	377,139
Rapeseed Oil	b	176	27,428[b]
Sunflowerseed (Oil Equiv.)	d	2,123	7,686
Margarine & Shortening[a]	e	41	275
Vegetable Oils & Fats (n.e.s.)	56	674	5,852
Totals	3,834	92,734	441,144

[a]Margarine not reduced to Oil Equivalent.
[b]3-year average, 1973-75 only.
[c]2-year average, 1954-55 only.
[d]No information for period 1951-55; included in Vegetable Oils & Fats n.e.s.

Source: Statistics Canada, Cat. 65-004.

Table 18.4 CANADIAN OILCAKE AND MEAL PRODUCTION, IMPORTS AND EXPORTS, 1971-1975 AVERAGE

Crop	Production	Imports	Exports
		- tonnes -	
Rapeseed	183,374	-	30,945a
Sunflowerseed	8,778	-	-
Soybeans	509,760	238,612	98,890
Flax	34,615	-	7,797
Cottonseed	-	413	-
Oilcake and Meal (n.e.s.)	-	1,523	1,194

[a]Three-year average, 1973-75.

Sources: Statistics Canada, Cat. 22-006 based on crop year, and Cat. 65-004 and 65-007 based on calendar year.

No data on the import and export of sunflower cake and meal are available. Moreover, Statistics Canada makes no specific reference to the information being included in the 'Not Elsewhere Specified' (NES) category. Trade in this commodity must be small, if it exists.

Soybean meal production data are based on the crushing of both domestic and imported soybeans; the 1971-75 average imports of soybeans was 354,545 tonnes. Thus, the weight of beans imported is about 70 percent of domestic production while the amount of meal exported ranges from 41 to 85 percent of the meal imported. Clearly, soybean meal is a major component in Canadian feed trade.

Production of linseed meal has fallen steadily since 1961, and at present only two flaxseed crushers operate in Canada. No linseed meal imports are listed by Statistics Canada, either specifically or as part of the NES total. Exports of linseed meal have also fallen, more rapidly than its production, suggesting some stability in its domestic use.

The importation of cottonseed meal dropped more than sixfold between 1961 and 1975. The import-export pricture of trading in miscellaneous oilseed cake and meal is one of small, fluctuating markets.

Some food-grade soy protein is imported, but the market is not yet highly developed. However, domestic production could be developed should the demand become large and continuing.

18.3.5 Inedible Oils

Linseed oil is the only inedible vegetable oil produced commercially in Canada. Domestic flax production has declined modestly since the late 1950's, and the volume of flax crushed has gone from a high value of about 74,000 tonnes in 1964 to the 1971-74 average of 55,000 tonnes (Figure 18.2). This represents approximately 12 percent of present flax production. Linseed oil exports have also fallen off markedly whereas flax seed exports (reported as oil equivalents) have declined less rapidly. Imports of linseed oil are not recorded after 1963 and the last flax seed was apparently imported in 1966.

Castor and tung oils, which compete with linseed oil, continue to be imported. Castor oil volumes have remained stable over the years at about 2,300 tonnes. Tung oil imports, however, have shown a steady decline since 1961, except for a partial recovery in 1972 and 1973, after which the volume was further reduced to the present level of 700 tonnes. Oiticica oil, another competitor of linseed oil, has not been imported in quantity since 1968.

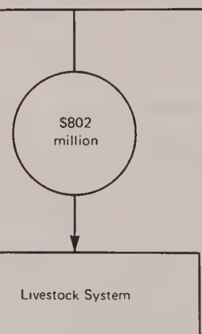
Canadian flax seed and the oil and meal obtained from it are of high quality. It is to be expected, therefore, that flax production will tend to hold at between 500,000 to 600,000 tonnes. Linseed oil has won a place, along with castor and tung oils, in the manufacture of protective coatings and printing inks.

THE CANADIAN FORAGE SYSTEM

1975

PRODUCTION

	Area	Production
Tame hay	5,002,000 h	24,843,000 t
Annual forage	887,000 h	9,436,000 t
Pasture	29,024,000 h	(10,630,000)[a] t



[a] Estimate based on feeding requirements.
h hectares
t tonnes

1. Forages are an essential part of Canadian livestock production, providing 70 percent of the diet of cattle, sheep and lambs, at a relatively low cost.

2. Improved pastures represent about 40 percent of the cultivated forage land in Canada or just over 4 million hectares. Census statistics show that since 1950 there has been a shift of this area from Eastern Canada to Western Canada. Unimproved pasture represents a significantly larger area but in most cases has very low productivity.

3. Tame hay production occupies 5 million hectares and is the main source of forage for livestock. A steady increase in area and improved cultural practices have made today's pastures and tame hay production a sound forage basis for the beef industry.

4. Ontario is the main corn silage producing area, although there has recently been some expansion of production in Western Canada and Quebec. Oats for green feed or silage help to make up the roughage requirements of many farms.

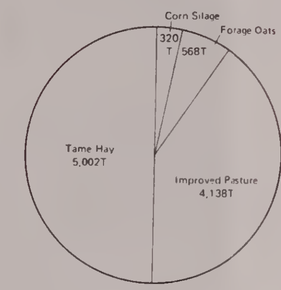
5. Research has been an important factor in the forage advances in the last 25 years. New cultivars specific to various regions of Canada have reduced the adverse effects of diseases and winterkill.

6. Forage production has undergone extensive changes in recent years because of new handling, processing and storage equipment. In many cases, this has allowed the harvesting to become a one–man operation

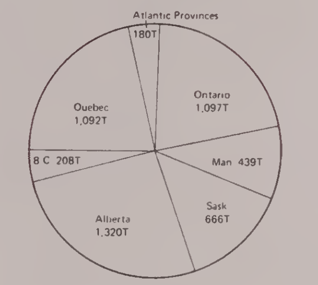
7. Seed production is a vital part of the forage industry, however, it has decreased in the last 15 years, making us more dependent on imported seed.

8. Dehydrated or processed forage production has increased dramatically since 1970. This facilitates storage, transportation, exporting and mechanized feeding of an otherwise bulky commodity.

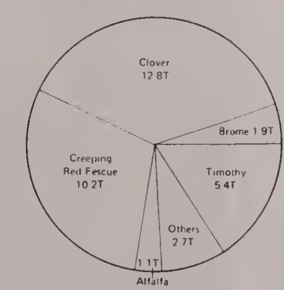
CANADA'S FORAGE PRODUCTION
10,028,000 hectares



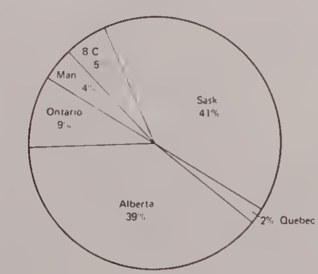
TAME HAY PRODUCTION
5,002,000 hectares



FORAGE SEED PRODUCTION
34 100 tonnes



DEHYDRATED ALFALFA PRODUCTION
221,350 tonnes



19. THE CANADIAN FORAGE SYSTEM

19.1 INTRODUCTION

Forage crops and pastures provide about 70 percent of the diet of cattle and are grown throughout the country wherever livestock are produced. The principal forage crops are grasses and legumes for hay and pasture, corn for silage, as well as oats and some other cereals harvested as green feed or silage. To a lesser degree, corn stover, cereal straw, millets, sudan grass and fababeans are used. The utilization of cereal straw is most significant in the prairie region while corn stover is an important source of feed in the grain corn areas of Ontario and Quebec.

Since forage crops are consumed directly by livestock at the site of production, and only very small amounts are traded, it is difficult to provide detailed value comparisons with other crops. Estimates by Statistics Canada cover the main types of forage, but these are not broken down by species.

19.2 THE PRIMARY SECTOR

The census data for cultivated forage crops in Canada (Figure 19.1) indicate that tame hay has generally accounted for more than 80 percent of the cultivated forage area since 1950. Value estimates are substantial and tame hay ranks third in farm value among field crops in Canada, being surpassed only by wheat and barley.

19.2.1 Regional Variations

Approximately 55 percent of the total forage area in Canada is located in the western region, with some variations on this where individual species are concerned (Table 19.1).

Tame hay area increase in the past 25 years has been of the order of 23 percent; however, the production pattern across the country has changed significantly. The eastern section has shown a substantial decline, particularly in terms of relative contribution to the national area (Figure 19.2). This decline has been particularly marked in the Atlantic provinces with a drop of 65 percent, while Ontario and Quebec have diverted about 35 percent of their area to other uses. The prairie region and British Columbia have increased tame hay area by 145 and 60 percent respectively.

Yields per hectare have advanced only slightly over the past 25 years, the national average having edged upward by 11 percent. Ontario and British Columbia have shown a consistent trend towards improved hay output per hectare, with increases of 28 and 18 percent respectively since the early fifties. As yields in the prairie region fluctuate somewhat, probably in

FIGURE 19.1 **FORAGE AREA, CANADA, 1951 to 1976**

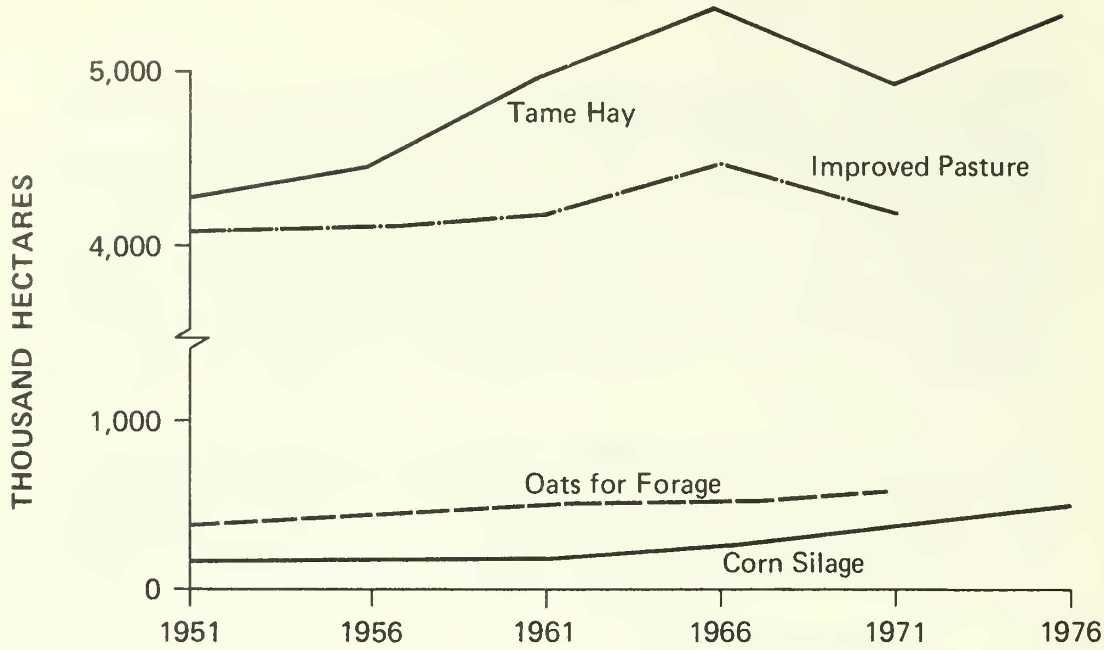
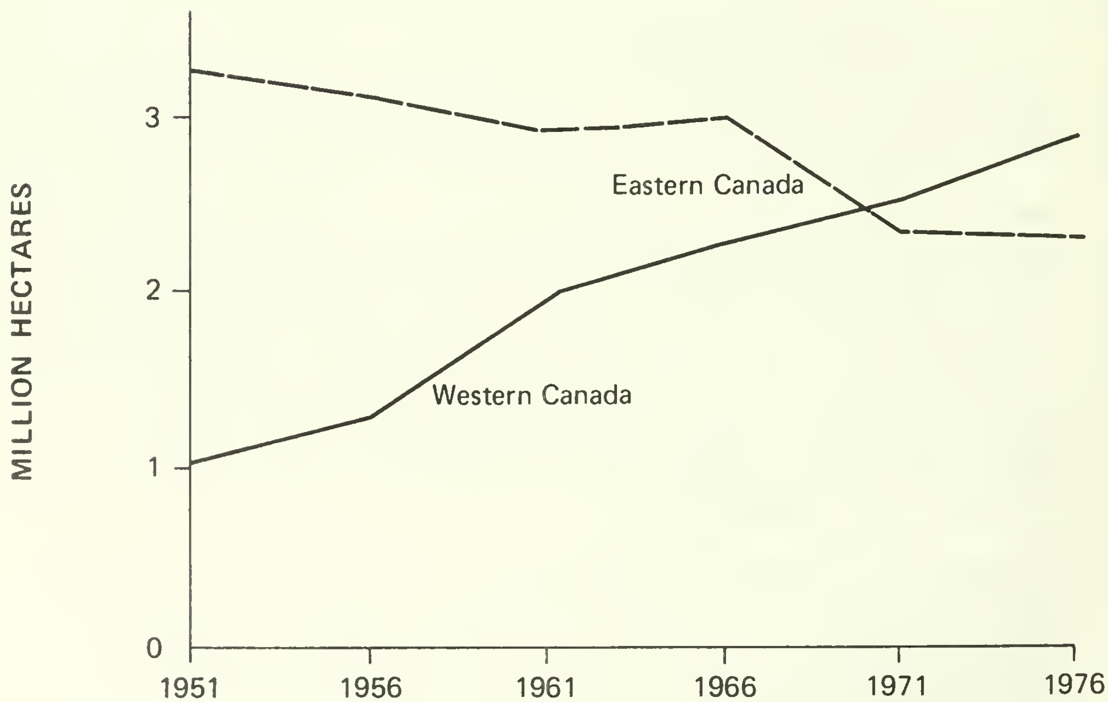


FIGURE 19.2 **TAME HAY AREA EASTERN & WESTERN CANADA, 1951 to 1976**



Source: Statistics Canada, Census of Agriculture, 1951 to 1976.

accordance with year-to-year precipitation variations, possible changes in productive efficiency are obscured.

Table 19.1 ESTIMATED FORAGE AREA BY PROVINCE, CANADA, 1971

	Tame Hay	Corn Silage	Forage Oats	Improved Pasture
	- 000 hectares -			
Canada	5.002	320	568	4,138
Atlantic Provinces	180	6	5	136
Quebec	1,092	53	77	694
Ontario	1,097	249	16	946
Manitoba	439	4	29	295
Saskatchewan	666	1	191	793
Alberta	1,320	2	233	1,113
British Columbia	208	5	17	161

Source: Statistics Canada, Census of Agriculture, 1971.

The area utilized for corn silage has increased steadily, with the exception of 1975 when there was a modest drop. Nonetheless, the 1975 area and total production represent gains of 151 and 206 percent respectively over 1950. Throughout this period, Ontario has remained the dominant centre of forage corn production. The prairie region has increased its corn area steadily although its share of national production has dropped.

By 1971, oats grown for green feed or silage had increased about 45 percent over 1951, but only modestly since 1961. No significant production changes have occurred within regions. There has long been a tendency for oats harvested for feed to increase during periods of low feed grain prices, with the reverse situation occurring in times of high grain prices.

While other forages have increased steadily in area over the period, they stood at less than 200 thousand hectares in 1971, with the prairie region accounting for most of the production.

Estimates of the area utilized for improved pasture have remained essentially unchanged between the 1951 and 1971 census periods. The only point of interest has been the fairly steady decline in the utilization of improved pasture in Eastern Canada while the reverse situation has pertained in Western Canada. The areas utilized as unimproved or wild-type pastures were first estimated in the 1971 census. Previously, the only approximations possible were from the statistics for unimproved land.

19.2.2 Research and Technology

Advances in Plant Breeding

Since climate is the overriding constraint to crop production in Canada, plant breeding has been, and will continue to be, the most effective means of achieving advances in forage production. Progress in forage crop breeding over the past 25 years has been very satisfactory. Broadly speaking, programs have been developed for three sets of conditions; the dry plains, the humid regions of Eastern Canada, and the northern or boreal forest areas. During the period under review, a total of 37 varieties of grasses and legumes are produced by Agriculture Canada research stations, and a further six varieties were contributed by universities.

Plant breeding programs have had some striking success in the development of cultivars for the dry regions of the prairies; notably in creeping rooted alfalfas, and in grass species such as brome, crested wheat, Russian wild rye and recently, Altai wild ryegrass. These species have made it possible to reseed derelict rangelands, with productivity gains of 300 percent and more per hectare. Programs in Eastern Canada have produced new varieties of timothy, orchardgrass, red clover and trefoil that have contributed substantially to higher forage production.

The major seed companies in Canada have recently shown an interest in forage plant breeding. Maple Leaf Mills Limited of Toronto entered the field in a modest way in 1970, and in the current year, Pickseed Limited of Richmond (Ontario) has started an active breeding program with alfalfa.

Cultivars from private American companies are widely grown, particularly those of alfalfa, orchardgrass, and a large number of fine turf kinds. Great Britain, Holland and Denmark also market a number of forage and lawn grasses in Canada. Thus far, 86 varieties of grasses and legumes of foreign origin have been licensed for sale in Canada. Prior to 1950, only five foreign sorts were licensed; since that time, however, their number has been increasing steadily to the point that they now are roughly equal in number to the Canadian varieties.

Looking ahead, it is likely that private plant breeding efforts with forage crops will tend to increase. Canadian companies are showing greater interest in such an undertaking. More significant, however, will be the activities of multinational firms and their Canadian subsidiaries.

Developments in Agronomic Practices

Because of regional differences in climate and soil, agronomic practices vary considerably across the country. Therefore, research relating to crop management must be carried on at several locations. Field studies are constantly increasing our knowledge of crop needs for plant nutrients under a wide range of soil conditions. In many areas of the country, crop responses have been correlated with soil analysis data, but the final completion of this task will require continuing research for many years. As fertilizers, particularly nitrogen, become increasingly costly, research to achieve maximum return per unit of input will have a particular urgency.

Row seeding systems and varying seeding rate trials for grass and legume combinations have made significant contributions to forage yield on the dry plains region of Alberta and Saskatchewan. Studies to determine the correct stage of harvest for a wide range of species have done much to increase recovery of digestible nutrients, and to render forage production more efficient. Irrigation technology is constantly being improved as research findings relative to equipment design and economy of water use are applied.

The need for general crop management work is lessening as extension services are being upgraded by the provinces. Much is also being accomplished with the cooperation of progressive farmers and their associations. Striking examples are the Foothills Forage Co-op Association in Alberta, the South Saskatchewan Forage Co-op and the grassland projects in Manitoba. These groups demonstrate new procedures and develop modifications to fit the needs of their members. Developments of this kind will probably continue and permit crop scientists to concentrate more on specific problem areas related to crop management, notably on plant physiology which is of direct concern to the efficiency of crop production.

Developments in Harvesting, Processing and Storage

Advances in this area have primarily derived from research on mechanization and engineering. Viewed over the past 25 years, progress has been dramatic. Mechanization of all aspects of forage production, harvesting and storage have sharply reduced labour inputs, and have provided the forage producer with a level of mechanization equivalent to that of the cereal grower. Also, and equally as important, mechanized harvesting systems make it possible to avoid much of the nutrient loss associated with over-mature harvest and unfavourable weather.

One of the more significant developments of the past 25 years has been the development of high-output mower-conditioners for hay and silage harvesting. Loose-hay handling and feeding systems based on portable stack forming and transporting equipment have sharply increased output per man over conventional bale handling methods. On smaller beef operations, balers producing large round bales of 450-900 kilograms are replacing old style pick-up balers. The development of modern forage-handling equipment and high performance tillage machines must be credited to the private sector. Involvement by research stations and other government agencies has been only peripheral, and principally in the area of performance testing.

Research by public agencies has been more important in the design of farm structures for storage and feeding. This is especially so in respect of low-cost storage methods involving bunker silos.

Advances in Plant Protection

Diseases are ever present and cause very significant crop losses. In forage crops, progress to date has been principally through plant breeding, whereby a succession of varieties embodying resistance to specific diseases have been released. The incorporation of resistance to bacterial wilt in alfalfa cultivars is a prime example. In grasses, good progress has occurred in selection for resistance to leaf spot diseases and rust. In legumes, generally little progress has been made thus far in developing materials with satisfactory levels of resistance to soil-borne organisms.

Insects cause significant losses in legumes and grasses. The exact value of such losses has never been accurately computed on a national or regional scale. In forage crops, it is sometimes possible to control a particular insect by the simple device of early harvest. In other instances, chemicals have been effective on specific target insects.

Weed control in forage has been a somewhat neglected area for much of the past 25 years, as the research effort in terms of scientific man-years has remained very low. Legume crops are generally highly susceptible to damage by the available weed control chemicals. Grasses on the other hand are much more resistant to chemical injury and effective weed control procedures have been developed.

Weed control in rangelands and wild pastures presents a special problem. Rough terrain makes access difficult and precludes the use of machinery. In addition, low land productivity renders chemical controls too costly for widespread use. Here biological control is being attempted, principally by the use of introduced insects that attack specific weed species. Advances by this method will be slow and the degree of control will in itself not be as clearly apparent as that obtained with chemical herbicides. However, as further knowledge is gained relative to the use of insect predators, it may be possible to integrate this into general range management procedures and thereby increase forage productivity on such lands.

Continuing research will be needed to achieve greater economy in the use of chemicals where they are the only practicable means of control, and to develop cultural procedures as practical alternatives to herbicides whenever possible.

Potential of Forage for Cattle

With the world's human population rapidly increasing, it is anticipated that the competition between man and animals for grains and oilseeds (or for land on which to grow them) will become more crucial as time progresses. Also, the world's fossil energy supplies are being rapidly diminished, and the cost of energy is increasing. These inevitable occurrences portend the critical need now for research that will lead to methods which will sustain profitable milk and meat production by ruminants on all-forage diets.

Although experiments tend to demonstrate the potential of all-forage diets in fattening lambs and beef cattle, as opposed to a conventional high-grain diet, the major limitation of present-day forage of a practicably high quality is that it cannot be consumed in insufficient amount to support high levels of milk production. Some of the broad subjects needing research attention are: (1) improvement of the rate of consumption and net energy concentration of forages; (2) improvement of forage production per unit of land area at a minimal cost of energy and, development of land not suited to grain production; (3) further improvements in methods of culture, harvesting, preserving, storing, processing and feeding forages; and (4) development of technology to put greater reliance on the grazing of forages, at least for certain kinds of animals during certain periods of life.

19.3 THE SECONDARY SECTOR

The secondary sector is of relatively minor importance in the forage crop industry; almost all production is utilized directly by livestock, usually on the farms where the forages are produced. In recent years, alfalfa dehydration has developed in Western Canada. There are limited exports of hay. The forage seed industry, with a significant export component, could also be regarded as a secondary sector activity.

19.3.1 Hay Trade

There is a modest export of hay. An offsetting growth in imports has developed, consisting mostly in the movement of high-grade alfalfa hay from Washington State into the lower Fraser Valley area of British Columbia, a feed-deficit region.

19.3.2 Forage Seed Production

Estimates of forage seed production are not compiled by Statistics Canada. The most reliable information is that from the Plant Products Division of Agriculture Canada, based on seed inspections. Total forage seed production has been surprisingly stable since the early fifties. Farm values for the past five years (Table 19.2) have been calculated on the basis of rather sketchy price data, since there are no published price series for forage seeds in Canada and prices fluctuate in accordance with individual buyer-seller arrangements. Farm prices for individual varieties of forage seeds have varied widely depending on demand.

The United States is the principal importer of Canadian forage seeds, accounting for 65 percent or more of our exports. Western Europe and Japan take most of the remainder, with very small movements to Latin American countries (Figure 19.3). Opportunities for further expansion of exports of forage seeds are not great. Canadian cultivars have been bred for hardiness and adaptation to a short growing season. In consequence, very few perform satisfactorily in the longer-season areas of Western Europe. Moreover, strong plant breeding programs and domestic subsidy programs for seed production in the EEC countries make it difficult to enter the market with Canadian seed.

Traditionally, a major part of Canadian seed exports have been in the non-pedigreed category, but current regulations within Western Europe prevent the entry of such seeds. In consequence, Canada will have to develop its share of the market based on pedigreed varieties. A necessary first step towards this has been to enter varieties in the national merit tests of each country; when performance is satisfactory, a variety is placed on the national approved list. A modest degree of success is being achieved in this direction in Britain and other Western European countries. The United States market has not been as rigidly regulated as that of Europe. However, private plant breeding programs are active and the promotional efforts of American companies provide strong competition. In fact, the penetration of American 'private' varieties of alfalfa and orchardgrass has been serious even within Canada.

Contract production of European varieties has been increasing in Canada within recent years. This is concerned with varieties not licensed for use in this country and all seed is returned to the contractee in the country of origin. Success in this enterprise has been highly variable. A major problem in many instances has been the lack of adaptation to Canadian conditions. A further problem has been the limited skills of growers and a lack of knowledge of the characteristics of the varieties being contracted. Some of these problems being overcome with experience, the remaining problem then is price. Forage seed prices have been highly volatile and most companies favour forward-contracting at a stated price. This is not always acceptable to the growers. The recognition that many Western European countries have substantial support programs at the producer level for domestic seed production, makes predictions of future expansion purely speculative. The situation in Japan is somewhat different in that their climatic conditions and scarcity of land make local forage seed production relatively unattractive. Our penetration of this market will be determined by our capability to compete with American seed producers.

Table 19.2 FORAGE SEED PRODUCTION AND MARKETING, CANADA, 1970-1974 AVERAGE

Kind	Production	Domestic Disappearance	Exports	Imports	Farm Value of Production
		- 000 tonnes -			$ 000
Alfalfa	1,140	3,519	147	2,700	1,286
Birds-Foot Trefoil	502	233	-	12	801
Bromegrass	1,856	2,409	393	471	590
Clover-Alsike	3,574	709	3,280	7	985
Clover-Red	4,746	1,117	4,319	358	1,896
Clover-Sweet	4,301	885	4,216	72	539
Clover-White	185	395	-	253	-
Creeping Red Fescue	10,188	1,226	9,059	122	4,628
Meadow Fescue	772	95	1,041	54	187
Russian Wild Rye	427	266	60	19	287
Perennial Ryegrass	124	298	-	269	-
Timothy	5,366	3,386	2,864	835	1,909
Crested Wheatgrass	872	420	441	68	274
	34,053	14,958	25,820	5,240	13,382

Source: Plant Products Division, Agriculture Canada.

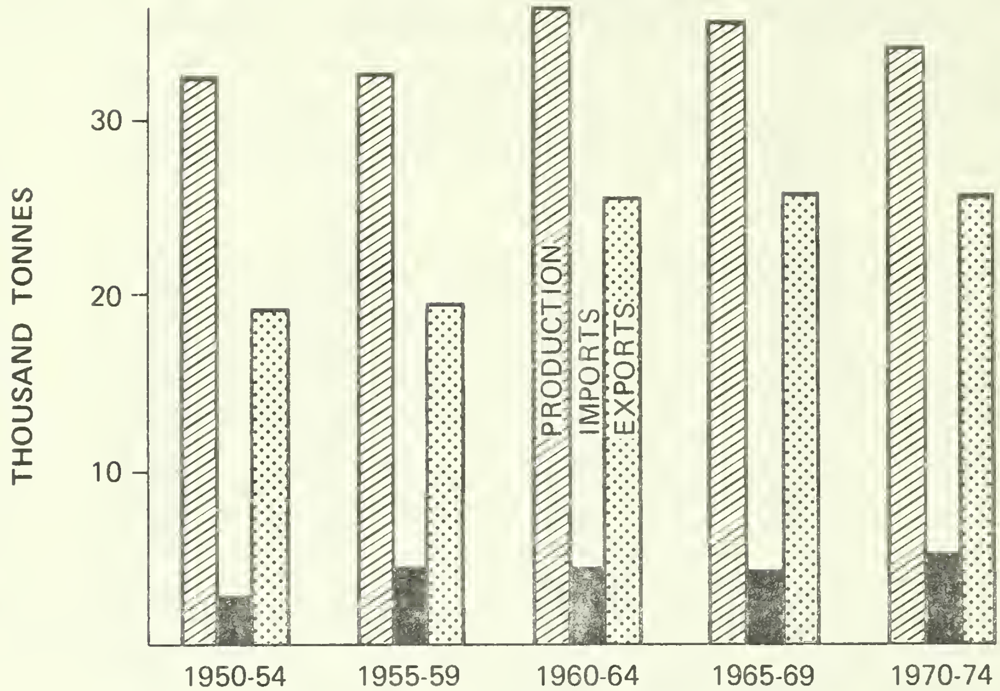
A strong merchandising system is required if Canada is to compete in domestic or export markets. At present, there are 94 authorized establishments which clean and seal forage seeds. About 25-30 of these firms are wholesalers or retailers of seeds as well. In total, 70 firms (wholesale and retail) sell forage seeds and virtually all these firms are members of the Canadian Seed Trade Association.

In summary, the Canadian forage seed industry will tend to remain at its present level for a considerable time into the future. The estimates of domestic disappearance of forage seed indicate a low level of usage when related to the total area of forage crops. Therefore, there is considerable potential for increased domestic use to offset possible declines in export production.

19.3.3 Processed Forage Products

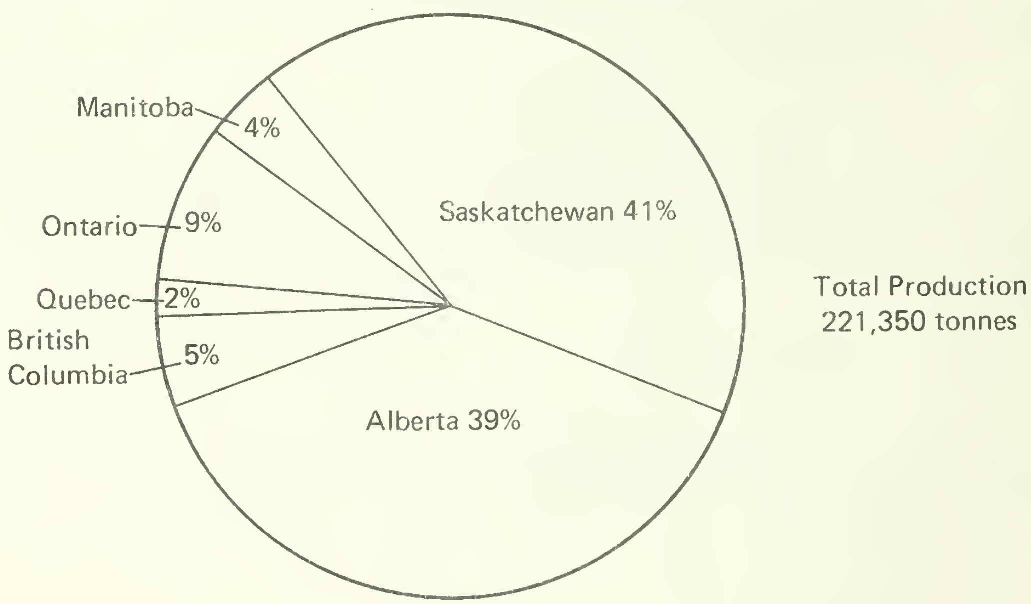
In Canada today, there are about 40 plants which process forage products. More than 80 percent of these are in Alberta and Saskatchewan (Figure 19.4). Alfalfa is cut in the field, trucked to the plant where it is dried and pressed into pellets or cubes, thus allowing for easier storage, handling and transportation plus yielding a very high quality product. Approximately 220 thousand tonnes of forage are handled in this

FIGURE 19.3
FORAGE SEED PRODUCTION, IMPORTS & EXPORTS, CANADA, 1950 to 1974



Source: (1) Plant Products Division, Agriculture Canada
(2) Statistics Canada, Cat. 65–202 and 65–203.

FIGURE 19.4
DEHYDRATED ALFALFA PRODUCTION BY PROVINCE, CANADA, 1975



Source: Plant Products Division, Agriculture Canada manner, representing slightly more than 50,000 hectares of forage land. Until the 1970's, production was stable at about 50,000 tonnes per year, then expansion began in Western Canada because of the export market to Japan. Today, exports stand at 80,000 tonnes leaving two-thirds of Canadian production for the domestic market; some is sold directly to livestock producers while the rest goes to feed manufacturers for incorporation into other feeds. Western Canadian plants have progressively gained a comparative advantage over American plants in export sales. High United States land, labor and fuel costs have severely reduced their export activity.

Natural gas is the key input factor. As approximately 3 million cubic meters of natural gas are required to produce one tonne of dehydrated alfalfa, the dehydration industry in Canada needs 750 to 900 million cubic meters of natural gas per year. Rapidly-rising costs and greater energy conservation awareness have made this factor of prime importance.

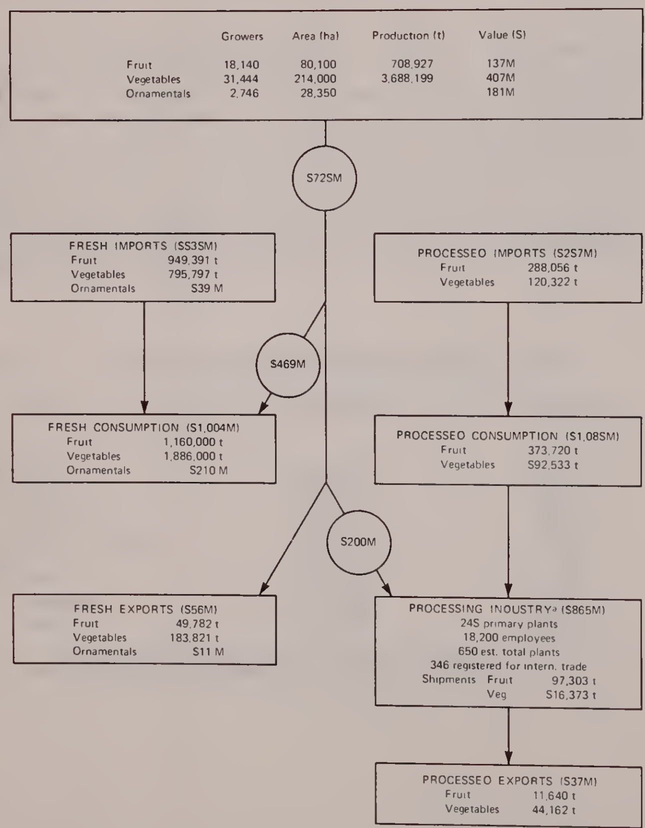
The raw material must be purchased from local farmers within a 24-kilometer radius of the plant. In order to obtain a continuous supply of hay, long-term contracts are often used and farmers are encouraged to become company shareholders. A plant must offer prices that make alfalfa production competitive with other crops. To the farmer, this outlet offers an alternative marketing route for his product.

As many as 30 employees may be needed by an alfalfa processing plant, including some seasonal labour during the busy summer harvest. Many of these plants are located in small communities where these extra jobs are a positive addition to the local economy.

The Saskatchewan, Alberta and British Columbia forage processing plants have capacities considerably larger than those in Eastern Canada and Manitoba. Many of them are operating well below capacity at present, especially in Alberta and British Columbia. The greatest concentration of production is located in the northern parts of the prairies where forage crops are a viable alternative to grain production, and processing facilitates transportation to markets.

THE CANADIAN HORTICULTURE SYSTEM

1975



a Total shipments of all goods of own manufacture (1974)

M Million
t tonnes

1. The horticulture industry in Canada has a domestic production of $725 million and an imported quantity of $535 million fresh and $257 million processed products, countered only by the limited exports of $56 million fresh and $37 million processed products.

2. Over one—quarter of the fresh production is processed to some degree before sale to the consumer, with a value added figure of over $500 million. Some 245 major processing plants employ 19,200 workers.

3. The value of fresh and processed horticultural products produced or handled in Canada thus reaches a total of $2,089,000,000.

4. Nearly 312,000 hectares are devoted to horticultural production with about 53,000 growers and a total of 210,279 persons employed in the operation.

5. Horticultural products comprise 40–45 percent of the weight of food consumed by Canadians, and are particularly important as sources of vitamins (especially A and C) and minor elements. They also add much flavor to the diet and aesthetic value to home and work environments.

6. Horticultural production is most important in Ontario with approximately one—half of the total, Quebec and British Columbia share equally a third, and the Atlantic and Prairies Provinces produce the remainder.

7. Of the fruit production, apples comprise one—half the total area. Among the vegetable crops, potatoes hold a similar position.

8. Commercial production of winter–tender fruits (peaches, cherries, apricots, grapes) is confined to the Niagara Peninsula and Essex County of Ontario and the Okanagan Valley of British Columbia.

9. Seed potato production is centered in New Brunswick and Prince Edward Island, which are the source of most of the seed tubers exported. Table stock potatoes are produced in all provinces.

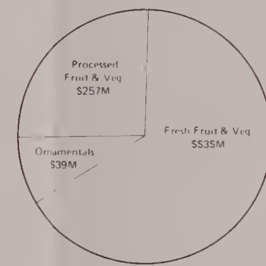
10. Greenhouse production of flowers and vegetables involves 320 hectares, with the greatest concentration in Southwestern Ontario.

11. Field production of other vegetables involves processing crops (tomatoes, corn, peas, beans, etc.) grown mainly on mineral soils and fresh market crops (carrots, lettuce, celery, cole crops) grown mainly on organic soils, primarily in restricted areas of British Columbia, Ontario and Quebec.

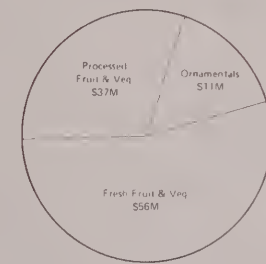
12. There is a significant trend in the whole industry towards vertical integration. The processing industry shows a marked trend towards fewer plants with larger individual capacity.

13. The volume of imports of processed products, especially fruit, has increased dramatically in the last decade.

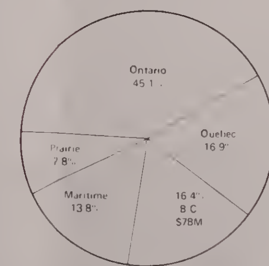
IMPORTS $831 MILLION



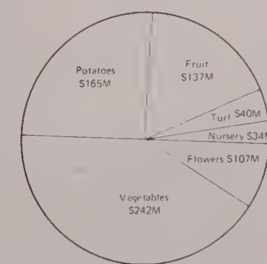
EXPORTS $104 MILLION



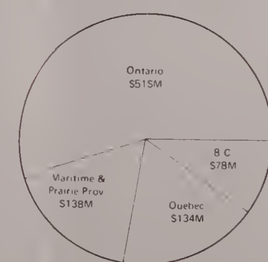
PRODUCTION DISTRIBUTION



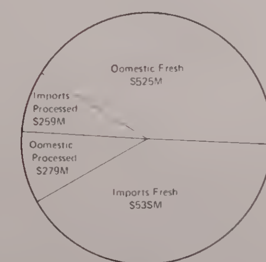
CASH RECEIPTS $725M



PROCESSING DISTRIBUTION $865M (1974)



DOMESTIC CONSUMPTION $1,505M[b] (Fruit & Veg)



20.0 HORTICULTURAL CROPS

20.1 INTRODUCTION

Production of horticultural crops in Canada is restricted by soil type, climate and topography, as well as by size and proximity of market. It occupies 311,520 hectares (Table 20.1) or 0.85 percent of the country's improved land area, and in 1975, generated $725 million in farm cash receipts from 708,927 tonnes of fruit and 3,688 thousand tonnes of vegetables.

In 1971, there were 52,330 farmers involved in horticulture, of which fruit and vegetable producers accounted for 37 and 60 percent, respectively (Table 20.2). In total, 229,165 persons are employed in the Canadian horticultural industry. Assuming a 40-hour week, and allocating 35 percent of farm cash receipts to labour at $2.98 per hour on 50,584 farms, it is estimated that 3.1 workers per farm or 157,824 people were employed on fruit and vegetable farms in 1975. Flower producers reported 7,376 full-time workers in 1973-74 and nurserymen indicated 2,307 full-time and 3,788 part-time employees. The offshore labour program employing of 95 percent Caribbean workers and 5 percent Mexican amounted to 5,500 people in 1975.

Table 20.1 AREA IN HORTICULTURAL CROPS, CANADA, 1975

Crop	Hectares	Percent
Apples	32,400	10.4
Other Fruits	38,800	12.4
Potatoes	100,000	32.1
Other Vegetables	112,000	36.0
Sod	12,000	3.9
Nursery	16,000	5.1
Greenhouse	320	0.1
TOTAL	311,520	100.0

Source: Statistics Canada, Cat. 22-003, 22-202.

Table 20.2 NUMBER OF PRODUCERS IN HORTICULTURE, CANADA, 1971

Fruit Growers	19,140	Tree Fruit	11,198
		Small Fruit	7,942
Vegetable Growers	31,444	Potatoes	16,120
		Other Veg.	12,447
		Greenhouse	2,741
		Mushrooms	136
SUB-TOTAL	50,584		50,584
Flower Growers (1973)	1,211		
Nursery Growers (1973)	415		
Sod Growers	120		
TOTAL	52,330		

Source: Statistics Canada, Cat. 22-003 and 22-202.

The fruit and vegetable industry supplies 40 to 45 percent of the weight of food consumed by Canadians and over one-half of the dietary fibre essential to the proper functioning of the digestive system. Fruits and vegetables contribute about 90 percent of the ascorbic acid; 55 percent of the vitamin A; 30 percent of the folic acid; 20 percent of the niacin; 15 percent of the thiamine and carbohydrate; over 10 percent of the riboflavin and calcium; nearly 10 percent of the protein; and, less than 5 percent of the fat in our diets. They are an important source of essential minerals including calcium, iron, iodine, magnesium, manganese, phosphorus, potassium, sodium, sulfur, copper, cobalt, zinc, fluorine, and molybdenum. Also, the pectin present in many fruits and vegetables is believed to reduce the cholesterol level of the blood serum.

However, the importance of the horticultural industry goes beyond its economic and nutritional impact to affect the overall life style of Canadians. There is increasing public awareness of the need to preserve our national environment and to improve the home and work surroundings. Major research areas are centered around ornamental horticulture, but equally important is the maintenance of arboreta, botanical gardens and national botanical collections.

While ornamental horticulture is usually considered in terms of its aesthetic value, many of its elements are also of great functional importance. The control of wind and water erosion and the abatement of noise and heat in human settlements, are examples of horticulture's other contributions to the improvement of the Canadian living environment.

20.2 THE PRIMARY SECTOR

Canada produces about 30 percent of the fruits and 68 percent of the vegetables it needs. Approximately 95 percent of the ornamentals bought by Canadians in 1975 were grown domestically. In the same year, fruits, vegetables and ornamentals accounted respectively for 15.9, 60.6 and 23.5 percent of the farm value of horticultural production (Table 20.3). Over 50 percent of Canada's horticultural produce originates in Ontario, which is superseded only in potato production by the Atlantic Provinces (Table 20.4).

Table 20.3 PRODUCTION AND TRADE OF FRESH FRUITS, VEGETABLES AND ORNAMENTALS, CANADA, 1975

		Fruits	Vegetables	Ornamentals	Total
Production	tonnes	708,927	3,688,199	--	--
Farm Value	$000	$122,712	$466,880	$181,000	$770,592
Imports	tonnes	949,391	795,797	--	
Value of Imports	$000	$274,168	$192,649	$ 38,963	$505,780
Exports	tonnes	49,782	183,821	--	
Value of Exports	$000	$ 15,375	$ 29,623	$ 10,924	$ 55,922

Source: Statistics Canada, Cat. 22-003.

Table 20.4 FARM CASH RECEIPTS FROM HORTICULTURE BY REGION, CANADA, 1975[a]

	Ontario	Quebec	B.C.	Atlantic	Prairie	Canada
Fruit $000	66,431	15,912	43,565	11,455	--	137,363
	(48.4%)	(11.6%)	(31.7%)	(8.3%)		
Veg. $000	158,827	41,485	22,359	9,159	10,924	242,804
	(65.4%)	(17.1%)	(9.2%)	(3.8%)	(4.5%)	
Potatoes	33,115	27,545	11,532	59,173	33,440	164,805
	(20.1%)	(16.7%)	(7.0%)	(35.9%)	(20.3%)	
Ornamentals	70,456	9,809	9,993	8,926	6,099	105,283
	(66.9%)	(9.3%)	(9.5%)	(8.5%)	(5.8%)	
TOTAL	328,829	94,724	87,449	88,713	50,463	650,255

[a]Ornamentals (1974) do not include turf and nursery stock values.

Source: Statistics Canada, Cat. 21-001.

20.2.1 Resource Utilization

The major production and marketing inputs for horticultural crops are land, labour, machinery, energy, fertilizer, chemical and packaging material.

Land

Land use charges can be as high as 25 percent of the production cost. Land values for horticultural crop land vary from approximately $500-$750 per hectare in the prairies to higher than $12,500 in some orchard and market garden areas.

Labour

Growers have encountered difficulty in getting stoop labour. As a result, these needs have been reduced drastically for some crops, with advances in mechanical harvesting, chemical weeding, chemical thinning, and automated grading and packaging. Labour costs are significantly influenced by non-farm wage rates in the vicinity of production areas. These can vary from 5 percent of production costs for processing peas to 40 percent for potted plants.

Farm Machinery

Most of the farm machinery used in horticulture is imported, usually from the United States, and prices are generally higher in Canada since service charges are greater in a smaller market. However, there have been major improvements in the efficiency and effectiveness of all types of machinery.

Greenhouse Industry

In 1974, the total investment in greenhouses, the land they were on, connected buildings, and related machinery was approximately $147 million.

Energy

The proportion of operating costs for energy continues to increase as price rise. Crude oil prices in Canada increased by approximately 45 percent from 1973 to 1976 and have increased even more since that time, affecting all energy users. Fuel costs for greenhouse flowers have increased from 10 percent of production costs in 1968 to over 20 percent in 1974.

Fertilizer

Fertilizer costs in 1974 vary from less than 10 percent of total costs for growing peas to 20 percent for potato production. They increased from 12 percent in 1973 to 30 percent in 1974 and are expected to continue to increase along with the cost of energy.

Agricultural Chemicals

The use of chemicals for the control of insects, diseases, and growth is extensive in horticulture, but varies from almost zero to over 20 percent of the production costs depending on the crop. Canadian prices reflect world prices and are generally higher than those in the United States.

Packaging

Container costs also vary with the crop. Little cost is associated with bulk sales, while packages for fresh and processed products can account for as high as 20 percent of the selling price. These costs are likely to increase as the laws governing packaging and labelling become more stringent.

20.2.2 Industry Structure

Most primary production units in horticulture are family farm units. There are, however, large corporate farms and large farms operated by processing firms.

Provincial producer associations and most of the commodity groups have representatives on national associations - the Canadian Horticultural Council, Flowers Canada, Canadian Nursery Trades Association, and Canadian Mushroom Growers Association. Processors are represented nationally by the Canadian Food Processors Association and have provincial associations in British Columbia, Ontario and Quebec.

20.2.3 Technology

Yields of all types of horticultural crops have increased greatly over the past 25 years. New varieties, better insect, disease and weed control, better machinery and cultural practices have been responsible for this improved efficiency.

Mechanical harvesting of most processed crops and the use of harvest aids have improved harvesting efficiency. Better grading equipment, storage facilities and qualitative instruments have assisted in improving product quality. Improved storage techniques, notably controlled atmosphere (CA) storage in apples, and jacketed storages for carrots have allowed producers to extend their marketing period considerably.

The greenhouse industry, especially the floriculture segment, practices the highest degree of technology in all of agriculture. Controlled environments, wide use of chemical growth regulators, tissue culture for virus control and plant propagation, and precise maintenance of soil fertility levels are the key technological factors.

20.2.4 Marketing Channels

A mixed market system exists for fruits and vegetables. Direct farm sales, open wholesale market, negotiated prices, contracted prices and commission sales are all used to varying degrees. Marketing board powers vary from negotiating only to complete agency powers. At the farm level, florist products are marketed directly to retailers, to wholesale commission houses, chain store operators, through three-clock auctions, or direct to the public. At the retail level, mass merchandising of flowers in traditional and chain stores has become a new marketing system with its full potential yet to be realized.

Intermediaries in the market structure are:

29	Provincial marketing boards
48	Cooperatives
860	Wholesalers
3	Auction Clocks in British Columbia, Ontario and Quebec
51	Food brokers
26,216	Food stores
140	Farmer's markets

20.2.5 Government Programs

Although government programs specifically for horticulture are the exception, those that affect horticulture are basically related to production, marketing, and stabilization. Several that have had particular relevance to horticulture are the following:

Crop Insurance Act

An estimated 35,732 hectares of fruits and vegetables were insured for $18.6 million in 1972-73. Ontario insured the largest area of vegetables while British Columbia insured the largest area of fruit.

Fruit and Vegetable Storage Construction Financial Assistance Program

Financial assistance is provided to producer groups to construct and/or modify specialized storage facilities for fruits and vegetables. Assistance consists of one-third the total cost up to a maximum of $500,000.

Since the beginning of the program in December 1973, approximately 30 projects have been assisted with a total capacity of 0.3 million cubic meters. The federal government has contributed $3.2 million to this program.

Fruit, Vegetable and Honey Act

Section 56 and 57 of the regulations require importers of fresh fruits and vegetables of a kind grown in Canada to file a notification of purchase with Customs within 24 hours of the product leaving its point of production. This prevents unsold imports from entering Canadian markets and causing severe price depression or waste from overloading a market.

Agricultural and Food Products Market Development Assistance Program (AGMAP)

Administered jointly by the Department of Industry, Trade and

Commerce and Agriculture Canada, the program's objective is to expand or improve markets for Canadian products.

In 1975-76, $4.2 million was allocated to ten projects from the horticulture sector. These projects include assistance in funding the Fresh for Flavour Foundation, Canadian Seed Potato Agency and the Quebec Cider Association.

Customs Tariff Act

Tariff protection for fruits and vegetables is a combination of a specific seasonal duty when domestic product is available and a free or ad-valorem duty during the off-season.

Surtaxes have also been applied in years of large crop supplies. In 1971, a surtax was imposed on fresh and processed strawberries and in 1973 a surtax was imposed on sweet cherries.

Canadian tariff policy also provides for a remission of duty to processors of horticultural crops who have been unable to procure domestic product to fulfill their usual requirements as a result of unfavourable growing or seasonal conditions.

Agricultural Stabilization Act

The Agricultural Stabilization Board provides for stabilization of agricultural commodities at 90 percent of the previous five-year average return with an adjustment for the increase in the cost of production.

In 1974-75, a $12 million program was implemented to assist in marketing the large potato crop in Eastern Canada.

A surplus production of several fruits and vegetables during 1975 resulted in the development of programs to stabilize the income of producers as follows: sweet cherries - $176,000; summer pears - $290,000; prune plums - $411,000; carrots - $475,000; British Columbia raspberries - $750,000; and, apples - $12 million.

20.2.6 Competitiveness

In general, Canada is competitive in season for most fruit and vegetables (i.e., potatoes, rutabagas, carrots, onions, cole crops, apples, blueberries, strawberries, raspberries, and tender fruit). However, distress selling of imported fresh produce during our peak harvest season at certain times depresses prices to uneconomic levels.

Total disappearance is increasing more rapidly than production for several crops as imports take a large share of the expanding market (Figures 20.1 to 20.7). Canada should be able to capture a large share of some of the storage vegetable market (i.e., onions and cabbage). In the best production areas, yields of most crops under good management are comparable to those of the United States. A certain reduction in efficiency can be attributed to the smaller size of production units in Canada.

Tender fruit crops in general do not yield as well in Canada as in California, Australia, or South Africa. Some apple producing areas are also at a disadvantage because of higher labour and land costs and lower yields than in the Northwest United States.

In recent years, imports of apples have surpassed exports mainly due to aggressive marketing by other countries.

Mushrooms and greenhouse tomatoes are not grown as cheaply in Canada as in other countries, although their quality is often superior. Greenhouse vegetable production faces stiff competition from field grown imports and early domestic production. Lack of market planning and continuity of supply prevents expansion of this greenhouse vegetable production.

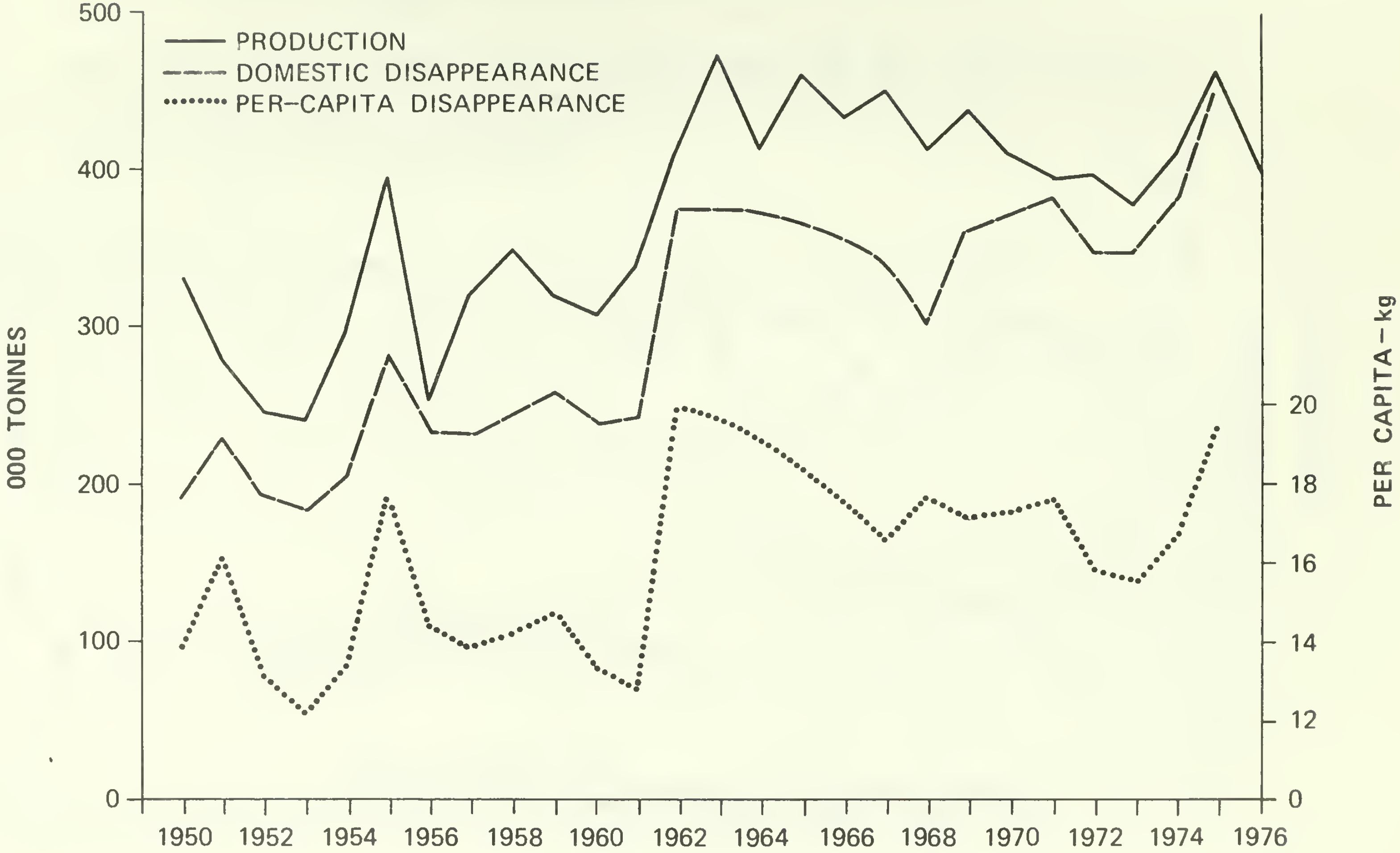
Imports of low-cost cut flowers have caused a shift from cut flower production to potted plant production.

20.3 THE SECONDARY SECTOR

Canada imports a large amount of processed fruit products, mainly canned juice and juice concentrate. Fruit processing is not expanding, except for blueberries and apple products. Exports are mainly frozen blueberries and apple products.

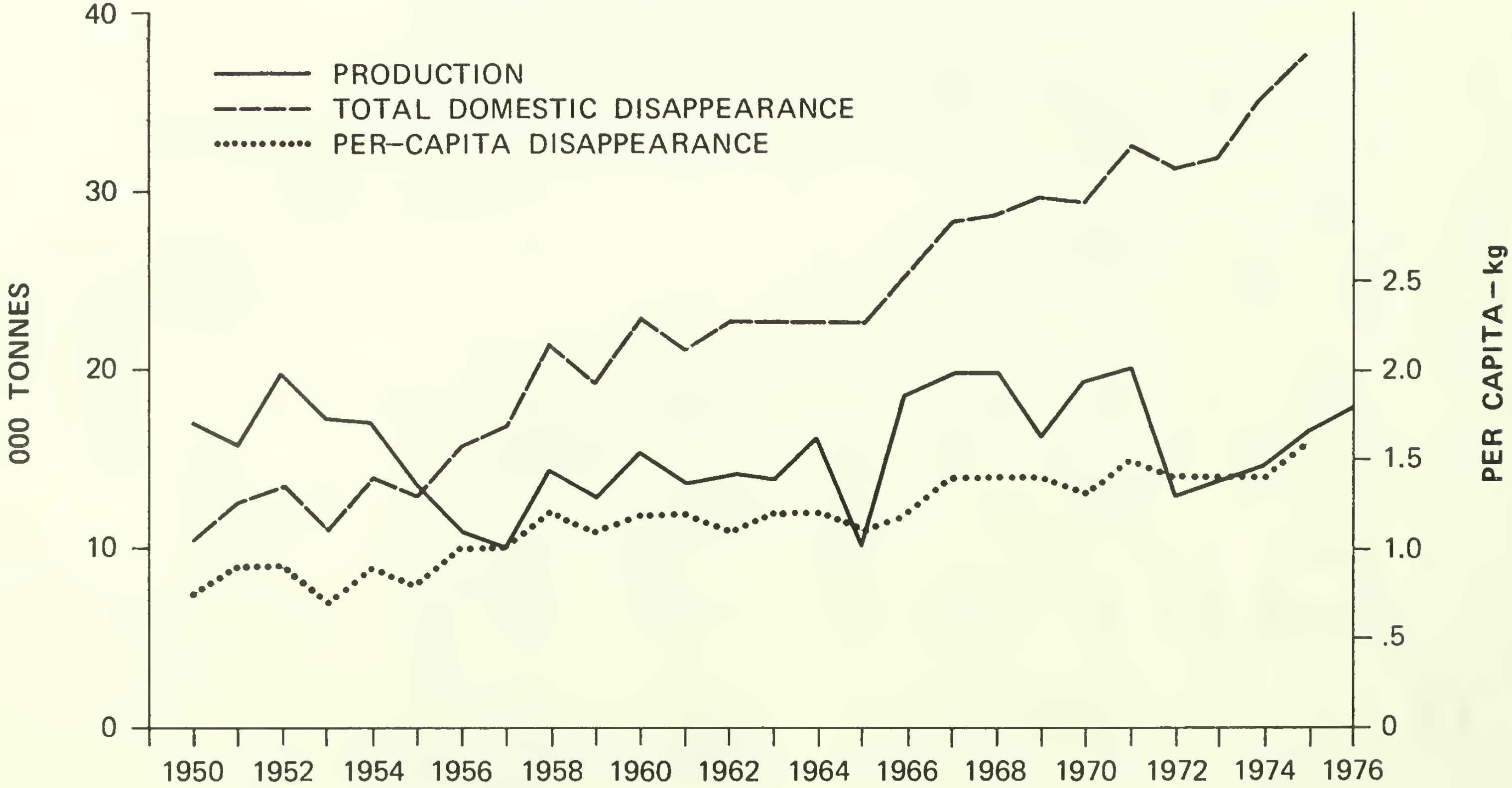
Vegetable products imported are mainly canned tomato products, canned mushrooms, dried vegetables, and preserved vegetables for reprocessing. Vegetable processing continues to expand slowly except in the above items. Exports are frozen vegetables, mainly potatoes and corn, canned corn, peas and asparagus, dried potato products, infant foods, and frozen, prepared dinners.

FIGURE 20.1 **PRODUCTION & DISAPPEARANCE OF APPLES, CANADA, 1950 to 1976**



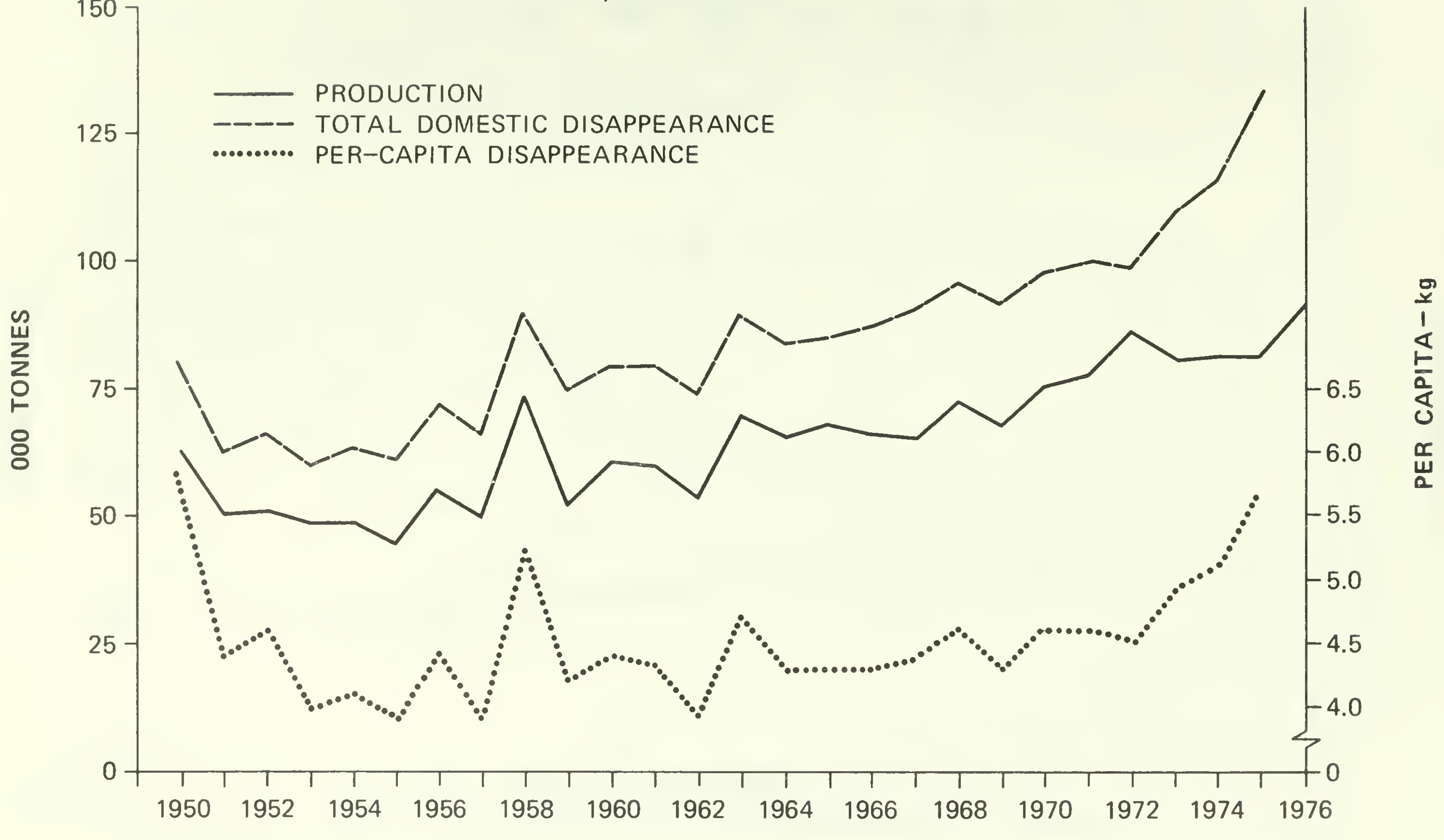
Source: Statistics Canada, Cat. 22–003 & 32–226.

FIGURE 20.2 **PRODUCTION & DISAPPEARANCE OF STRAWBERRIES, CANADA, 1950 to 1976**



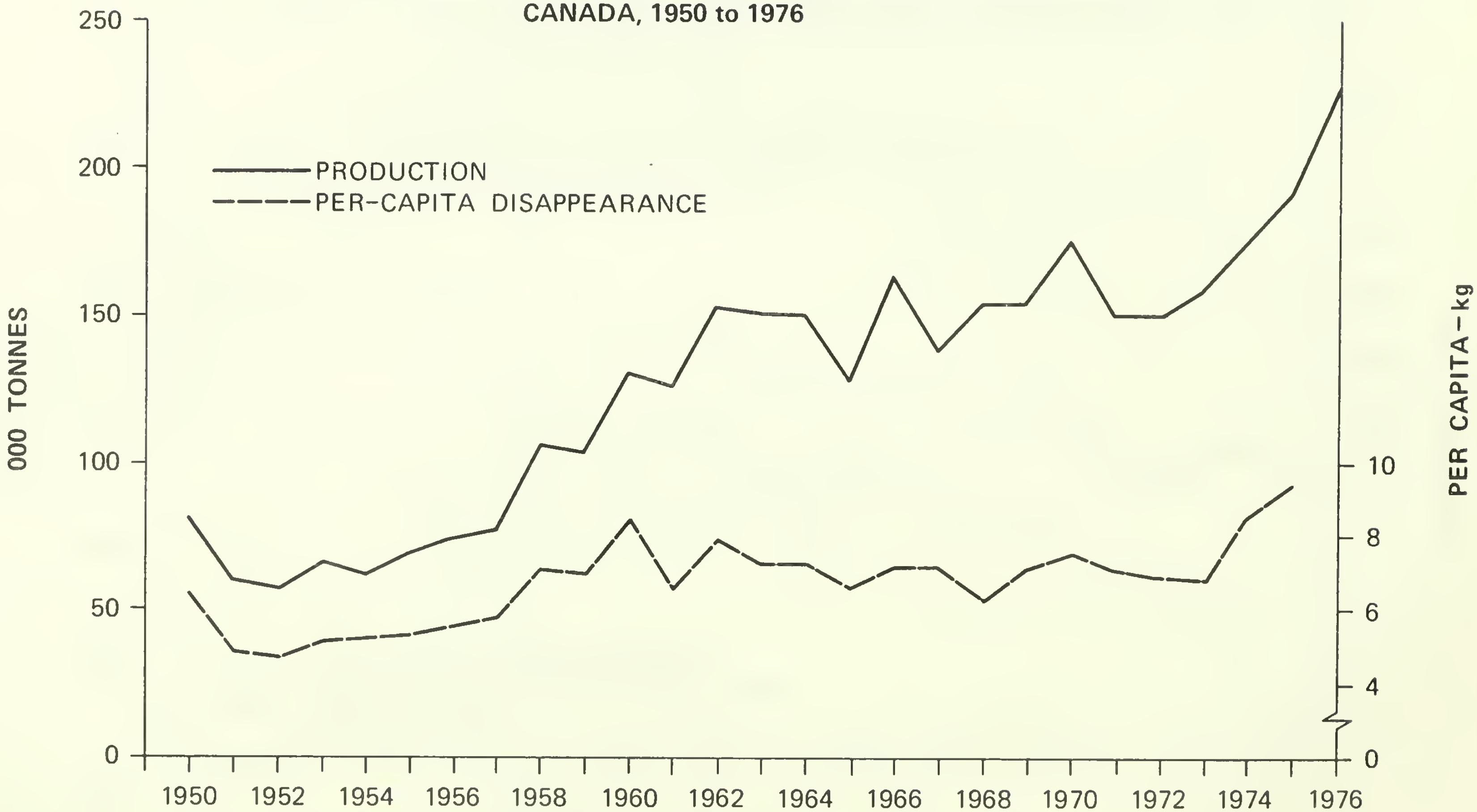
Source: Statistics Canada, Cat. 22–003 & 32–226.

FIGURE 20.3 **PRODUCTION & DISAPPEARANCE OF CABBAGE, CANADA, 1950 to 1976**



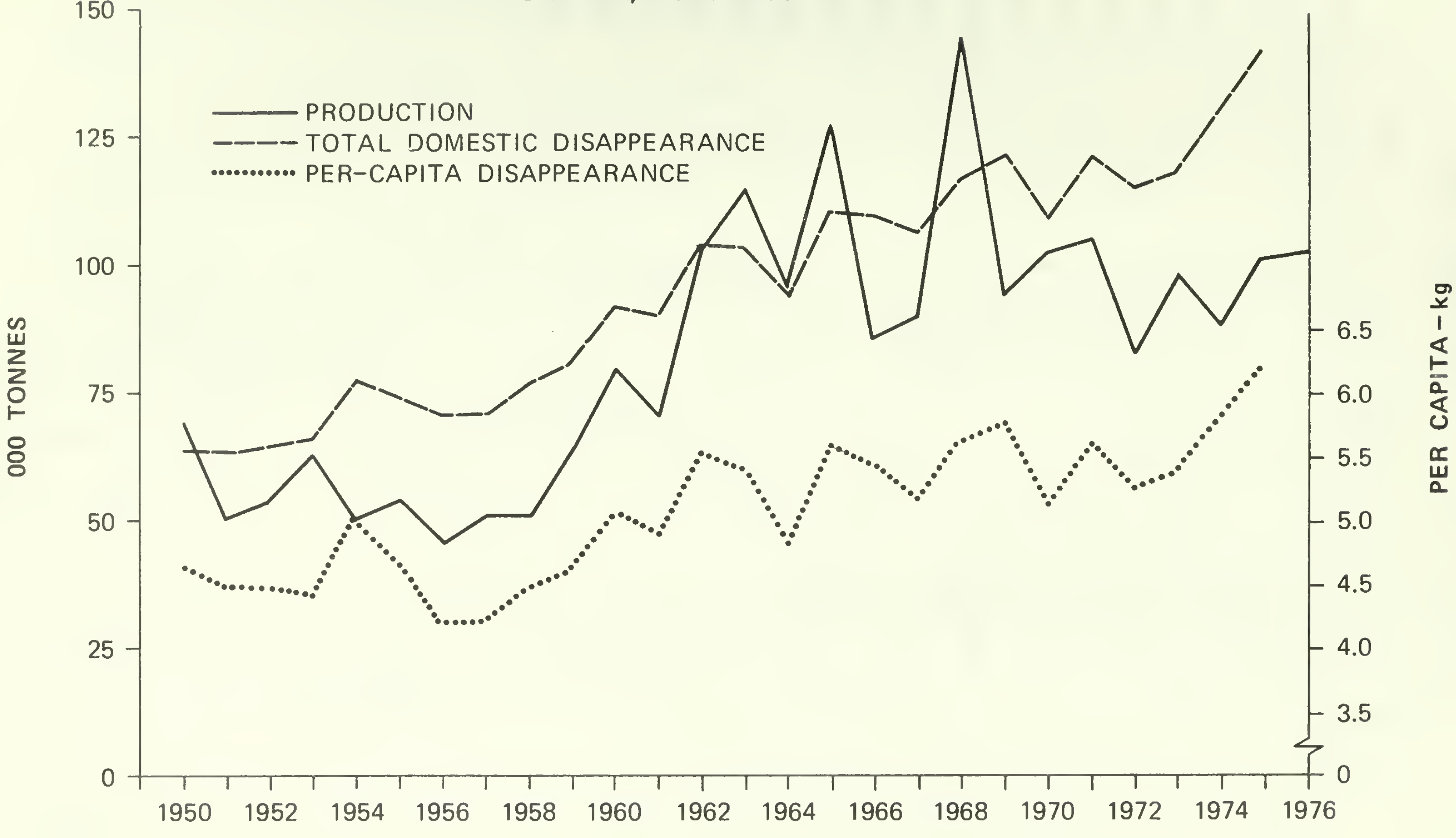
Source: Statistics Canada, Cat. 22–003 & 32–226.

FIGURE 20.4 **PRODUCTION & DISAPPEARANCE OF CARROTS, CANADA, 1950 to 1976**



Source: Statistics Canada, Cat. 22–003 & 32–226.

FIGURE 20.5 **PRODUCTION & DISAPPEARANCE OF ONIONS, CANADA, 1950 to 1976**



Source: Statistics Canada, Cat. 22–003 & 32–226.

FIGURE 20.6 PRODUCTION & DISAPPEARANCE OF PEAS, CANADA, 1950 to 1976

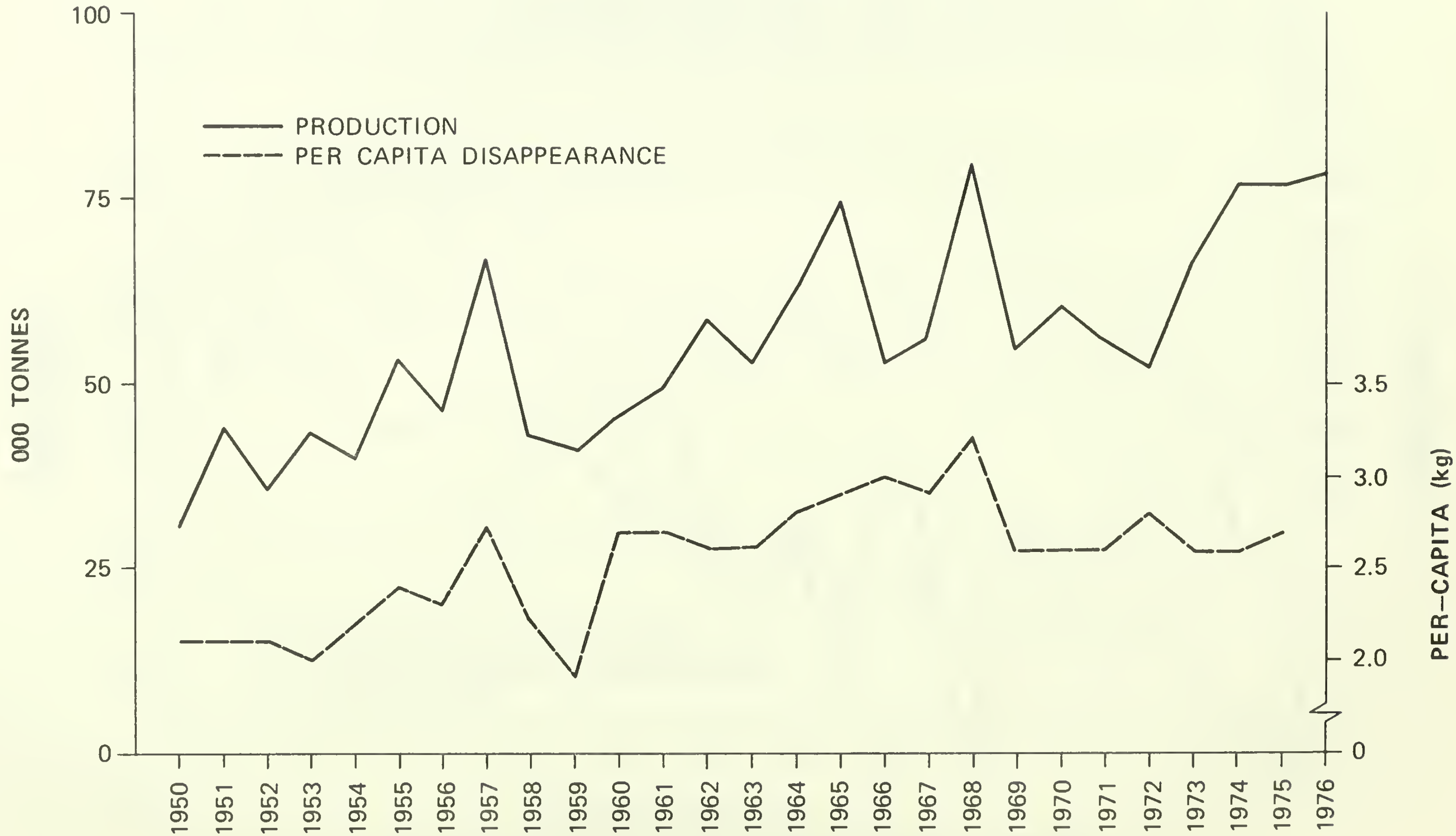


FIGURE 20.7 **PRODUCTION & DISAPPEARANCE OF POTATOES, CANADA, 1950 to 1976**

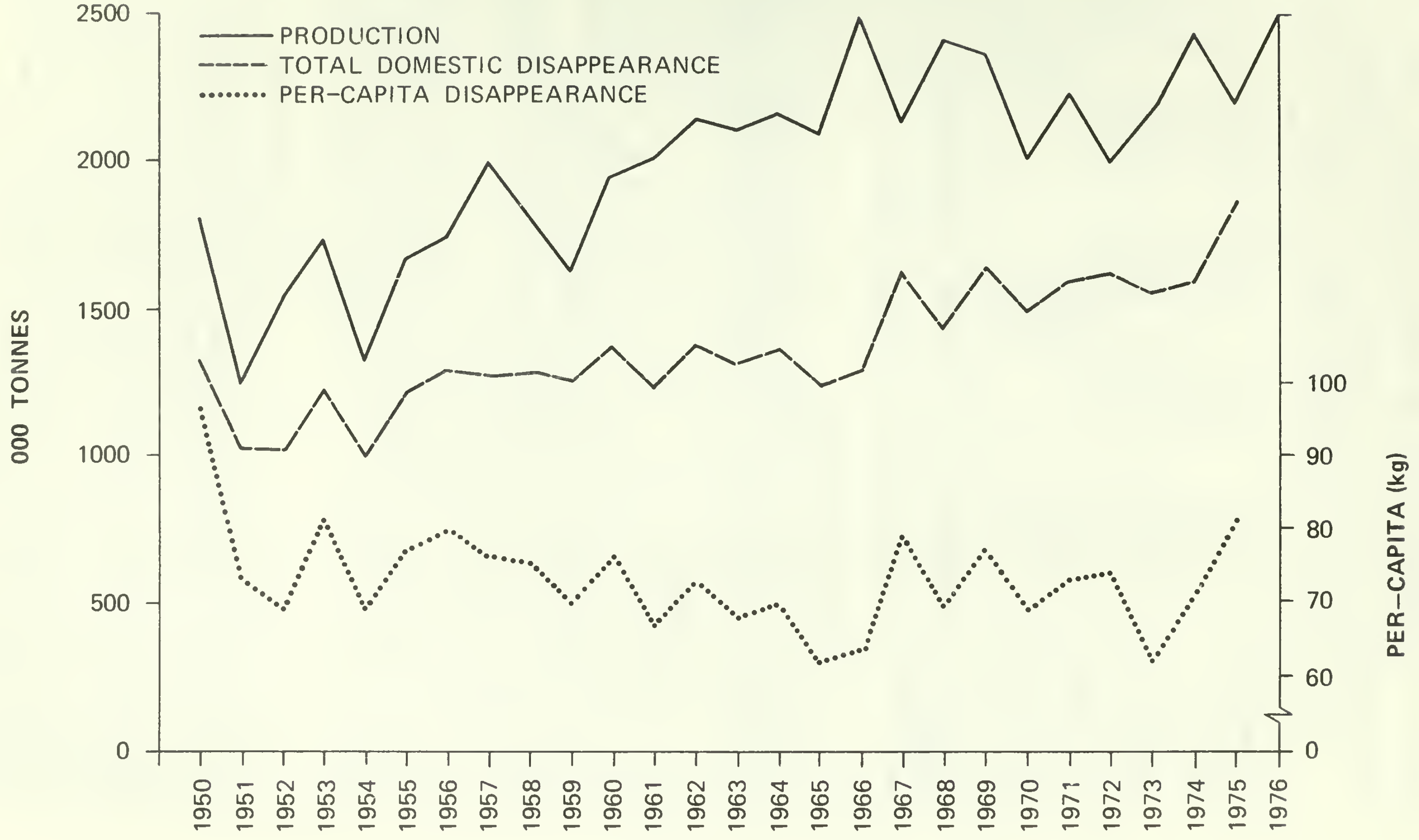


Table 20.5 PROCESSED FRUITS AND VEGETABLE INDUSTRY, CANADA, 1974

		Fruits		Vegetables	
		Frozen	Canned	Frozen	Canned
Shipments of	tonne	17,098	55,979	229,751	286,622
Own Manufactures	$000	16,307	36,040	111,545	152,555
Imports	tonne	14,522	101,157	13,364	90,988
	$000	9,304	56,189	6,203	57,707
Exports	tonne	3,157	8,263	24,242	8,475
	$000	1,808	6,945	12,339	7,062
Total Imports[a]	tonne	288,056		120,322	
	$000	180,210		76,727	
Total Exports	tonne	11,640		44,162	
	$000	9,055		28,342	

[a]Includes dried, preserved - not canned, concentrated and juices.

Source: Statistics Canada, Cat. 32-218, 65-004.

20.3.1 Regional Distribution

The majority of fruit and vegetable registered processing plants are located in Ontario (150) and Quebec (82), followed by British Columbia (49), the Maritimes (52), and the Prairie Provinces (13).

20.3.2 Technology

Considerable effort has been put into simple primary treatment of liquid and solid wastes inside and outside the processing plants. New machines for washing, peeling, scrubbing and other preparation functions pay attention to the low volume of waste water or the quality of the effluent, as well as to increased production or improved productivity.

Reduction of water consumption in plants has been accomplished by re-using water and by replacing flume transfer with mechanical transfer. More efficient use of energy and water have also been factors in the development of new blanchers and pre-or partial-cook machines.

To achieve improvements in quality and productivity some large vegetable canning plants have made a heavy capital investment in continuous pressure cooking machines. Continuous freezing facilities for fruits and vegetables allow storage and initial handling in bulk lots. Year-round packing activity is also scheduled to optimize warehouse space, labour use and marketing programs.

Extraction and clarification of fruit juices has been automated to improve productivity, although at the expense of lower yields. Increased cost of the traditional tin can has spurred investigation of polyethylene cans, two-piece cans, drawn steel cans, laminated pouches, and other cheaper packages.

Increased monitoring and inspection by government agencies has forced processing plants to improve processing methods and techniques. Training programs and quality assurance programs have also been improved.

20.3.3 Industry Structure

It is estimated that there are a total of 650 plants employing 18,886 persons (1973) which process horticultural food products in Canada. The Fruit and Vegetable Division of Agriculture Canada has 346 of these plants registered for interprovincial and international trade. One hundred and two plants pack only for local or regional distribution within the same province and thus are not registered under federal legislation. Another 106 plants produce partially-processed products, such as chilled fruits and fresh cut potatoes for restaurants and institutions. There are 29 plants making 'Saratoga' style potato chips, 12 distilleries making fruit liqueurs, 37 wineries and 16 cideries processing fruit juices into these beverages (Table 20.5).

Processors procure raw products in many ways depending on the type of product and provincial regulations. Many are bought on the open market, especially if imported. Some companies are also vertically integrated and produce a large portion of their own requirements. However, the majority of fresh produce is purchased under contract with individual growers, usually under the auspices of a marketing board. Often the company will employ a combination of all these methods to acquire raw product.

20.3.4 Marketing of Processed Fruits and Vegetables

Canned and frozen fruits and vegetables are sold in a number of ways. Some processors deal direct with retail stores; others use brokers or wholesalers; contract packing for other companies is often done, as well as for chain stores. Exports are made directly or through brokers. Again, many companies use combinations of several of these methods to sell their products.

20.3.5 Government Programs

Anti-Dumping Act

The Act provides that anti-dumping duties may be levied when dumping has been found to be causing or threatening to cause serious injury to Canadian industry.

In 1971, the Anti-Dumping Tribunal levied a duty against low-priced glacé cherries coming from Europe that were injuring the Ontario tart cherry industry.

Dumping of apple juice concentrate originating in Austria, Bulgaria, Greece, Hungary, and Switzerland was found by the Anti-Dumping Tribunal in January 1972 to be causing serious injury to Canadian apple producers.

Agricultural Products Board Act

The Act empowers the Agricultural Products Board under Cabinet direction to buy, import, contract for, sell and distribute agricultural products.

During the 1975-76 fiscal year, the Board was authorized to purchase and resell tart cherries in Ontario to facilitate the marketing of the crop. Also, canned solid-pack apples in Nova Scotia were bought at a price to ensure producers a fair return and later were resold in the United Kingdom.

20.3.6 Industry Trends and Problems

During the past 15 years, there has been a net decrease of 70 fruit and vegetable processing plants in Canada; however, the capacity of the remaining plants has increased (Figure 20.8).

Aside from consolidation within the industry, the practice of packing for other processing firms and chain stores under contract is increasing. Some firms are also contracting for processed products in other countries to be sold by them in Canada. Several large firms have greatly increased their product line through purchases from other firms which are then marketed with their own products.

Vertical integration seems to be increasing. Multi-national companies are continuing to purchase plants in Canada. The packing lines are also becoming less seasonal as firms repack and manufacture other products to maintain a steady labour force.

The Canadian fruit and vegetable industry faces a number of problems; the major ones are described below.

1. Inflation has had a considerable deleterious impact on the effectiveness of the existing tariff structure for processed fruits and vegetables. The specific (non-percentage) rates of duty for 'most-favoured nation' categories have become negligible as prices have increased in recent years.

2. Canada's decreasing self-sufficiency for several processed products (e.g., tomatoes, baby carrots, mushrooms, peaches, pears, strawberries in bulk) is of concern to the industry. Many tender fruit canners have ceased operations in recent years and only one now operates regularly in Ontario.

FIGURE 20.8 PLANTS AND VALUE OF SHIPMENTS, FRUIT AND VEGETABLE PROCESSORS, CANADA, 1950 to 1975

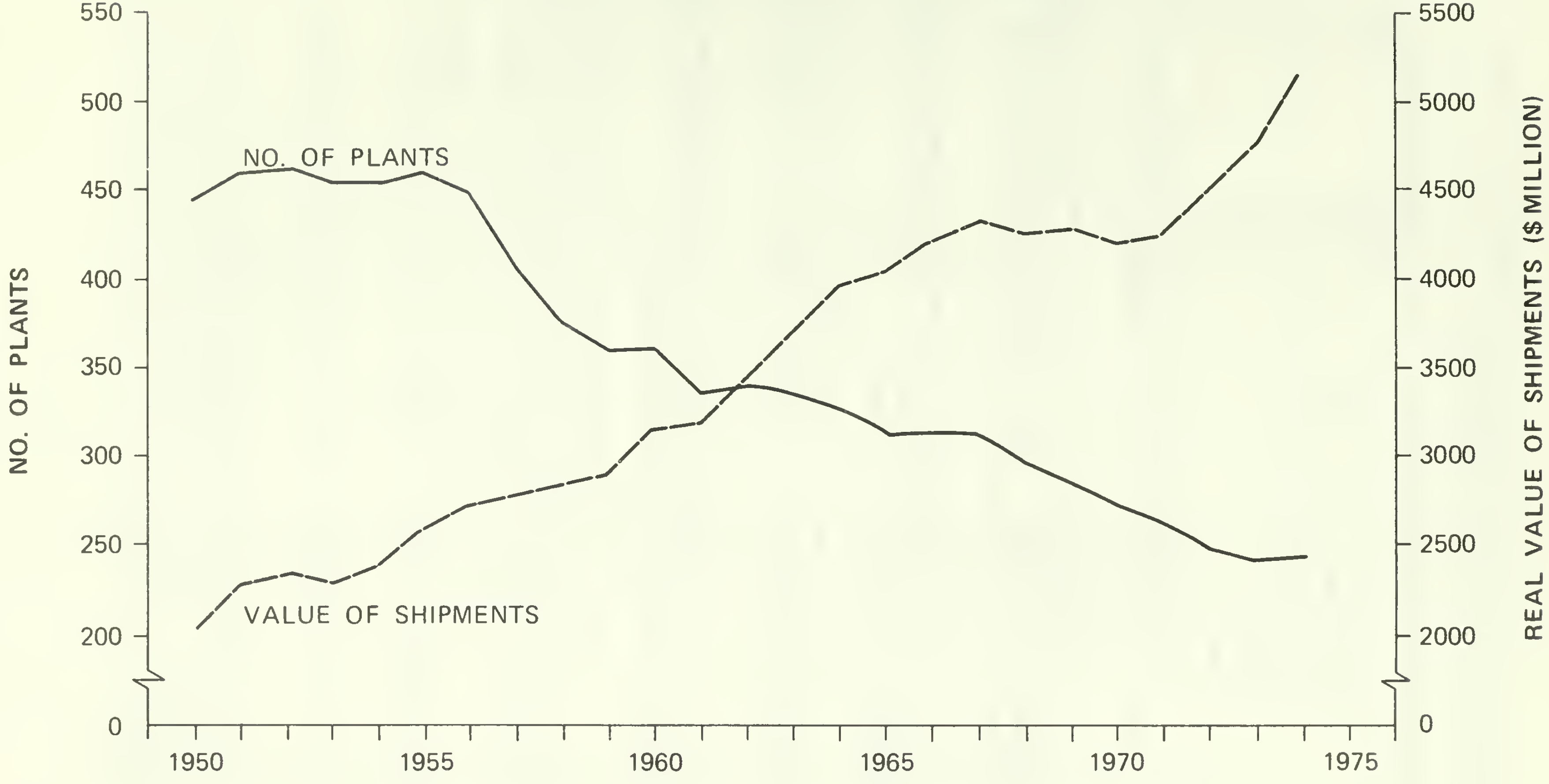


Figure 20.9 and the following table indicate the trend to use more imports in several commodities:

Imported Commodity (Canned)	Percent of Market 1963-67	1974-75
Carrots	2.8%	27.4%
Mushrooms	12.4%	59.0%
Tomato paste	n.a.	95.3%
Apricots	45.6%	73.0%
Peaches	52.7%	79.5%
Pears	17.0%	31.9%

3. Low-priced imports, both fresh and processed, continue to exert pressure on the Canadian industry.

4. Labour supply is difficult to obtain, not adequately trained and relatively costly. Reliance on off shore labour programs will continue. More labourers are unionized and unions are asking more and more fringe benefits.

5. The transportation system for perishable goods is inadequate and expensive because of the long distances and population distribution in Canada.

6. Class one land suitable for horticulture faces urban pressures and production is moving toward less favourable climates and soil types.

7. The Incentive to improve the production base is inadequate. Technological advances need to be further utilized to increase productivity for some commodities.

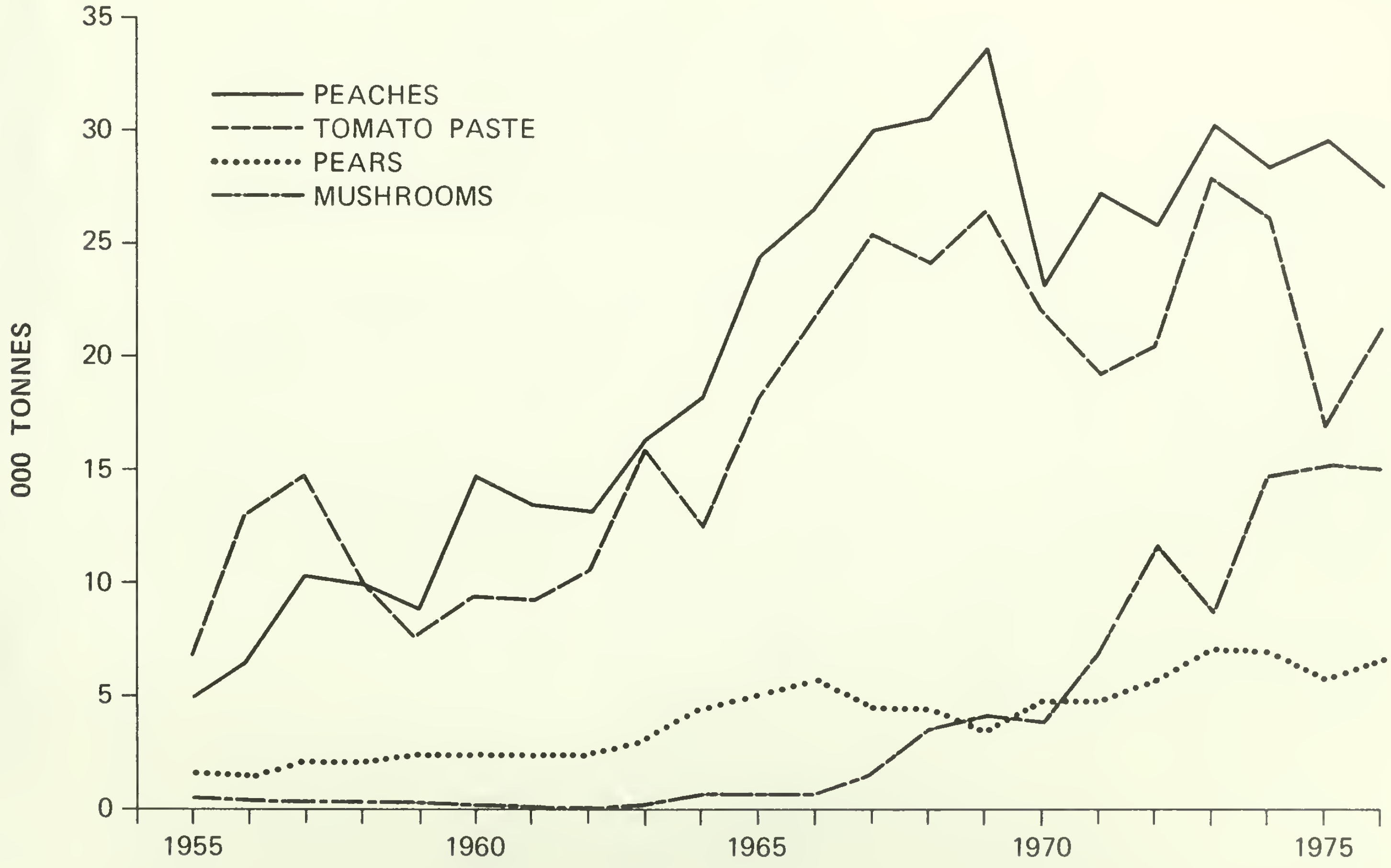
8. There is inadequate market information and coordination at the national level. A link between provincial marketing services and marketing organizations would improve the supply and distribution patterns, as well as the marketing strategy.

9. Improvement is needed in the storage and handling of some commodities, such as cabbage, to extend the marketing period of the Canadian product.

10. Research is needed on the production problems and on profitability in areas with climatic and soil limitations.

11. The spiralling costs of energy - two to three-fold in the past three years for greenhouse production in Ontario - represents an increase in heating costs from $25,000 to $62,500 per hectare. There is a critical need for new conservation technology, and exploration of alternative sources of energy for heating.

FIGURE 20.9 CANNED FRUIT & VEGETABLE IMPORTS, CANADA, 1955 to 1975



12. The rapid increase in greenhouse areas in Europe and South America poses serious problems for Canadian flower growers. Part of the solution is conversion from cut flower crops to potted plants - the latter being more difficult and expensive to transport over long distances.

OTHER CROPS

1970-74 Average

	Area (hectares)	Production (tonnes)
Tobacco	44,819	101,229
Sugar beets	29,420	911,880
Dry beans	51,320	78,300
Dry peas	30,680	45,800
Buckwheat	42,940	42,140
Mustard	96,176	94,800
Maple products	N A	8,615
Honey	427,552 colonies	23,045

S275M

Imports tonnes	
Tobacco	4,182
Sugar (raw)	973,814
Beans	6,600
Peas	4,800
Buckwheat	–
Mustard (prepared)	339
Maple	–
Honey	360
Total	990,095

S203M

S109M

Exports tonnes	
Tobacco	26,649
Sugar	30,641
Beans	35,700
Peas	19,300
Buckwheat	27,760
Mustard Seed	74,698
Maple	5,259
Honey	6,599
Total	226,606

S481M

Domestic Consumption tonnes	
Tobacco	78,529
Sugar (refined)	1,072,281
Beans	49,200
Peas	31,400
Buckwheat	14,380
Mustard	20,102
Maple	3,356
Honey	16,806

1. Other crops contributed about \$235 million to the Canadian economy, with a domestic production of \$275 million in raw product and an imported value of \$99 million in combined raw and manufactured items; exports amounted to \$58 million over the period 1950–74.

2. About 295,000 hectares are devoted to the production of other crops. Tobacco and dried beans are the most important cash crops in Ontario, while mustard, dry peas and sugar beets are important on the prairies.

3. Tobacco production provides about 20 to 35 thousand seasonal jobs during the harvesting period in August and September each year. Tobacco sales in all forms at the retail level generate about \$500 to \$750 million in federal revenue through taxation plus an additional \$200 to \$300 million in provincial sales tax revenue.

4. Raw cane sugar is Canada's largest import item, averaging \$89 million (and higher in high price situations – \$505 million in 1975) and supplying about 90 percent of the country's annual domestic disappearance of 44 kilograms per capita.

5. Tobacco is the most important export item, valued at \$35.4 million during the 1950–74 period and averaging \$3,381 per tonne shipped.

6. Canada produces two-thirds of the limited world supply of maple products. Commercial production is confined to the southeastern regions of Canada. Attempts are being made to expand the use of pure maple products.

21.0 OTHER CROP PRODUCTIONS

21.1 INTRODUCTION

Buckwheat, honey, maple syrup and sugar, mustard, new crops, pulses, sugar beets and tobacco accounted for an average of 0.67 percent of the 35.7 million hectares of cropped area in Canada during 1950-74. Most of these crops are restricted by soil type, climate, location and producer expertise. However, their average farm value was $166.7 million and amounted to 3.96 percent of the total farm income from crop lands during 1950-74 (Figure 21.1).

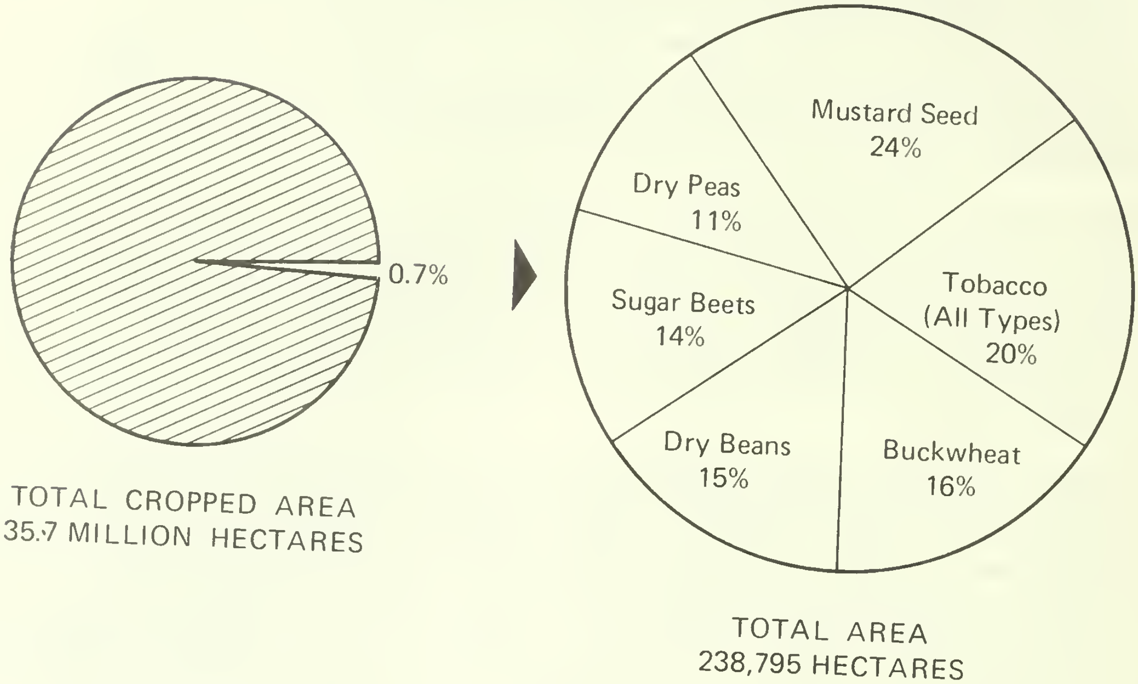
The amount of land devoted to the production of these crops was 295 thousand hectares in 1970-74 (Table 21.1). All require a high degree of skill, and some require expensive equipment to produce. Sugar beets are highly mechanized, but tobacco still requires much hand labour. Dry beans and dry peas require special climatic conditions for suitable growing and a degree of special skills to produce them.

Exports of other crops averaged $57.7 million during the 1950-74 period (Table 21.2) and during 1976 the value was $151.2 million. Tobacco and tobacco products, maple products, mustard and dried beans were the more valuable items exported, accounting for 61, 10, 9 and 7 percent, respectively, of the total value during the 1950-74 period. More recently, the export value of tobacco has declined to 44 percent of the total exported value of other crops as a result of a decline in the quantity of tobacco shipped. This decline in the quantity shipped has been primarily due to the decreased demand from the United Kingdom since it joined the European Economic Community in 1972. The loss of the British Preferential Tariff on tobacco will undoubtedly adversely affect our future shipments if alternative markets and pricing arrangements are not forthcoming in this area of international trade.

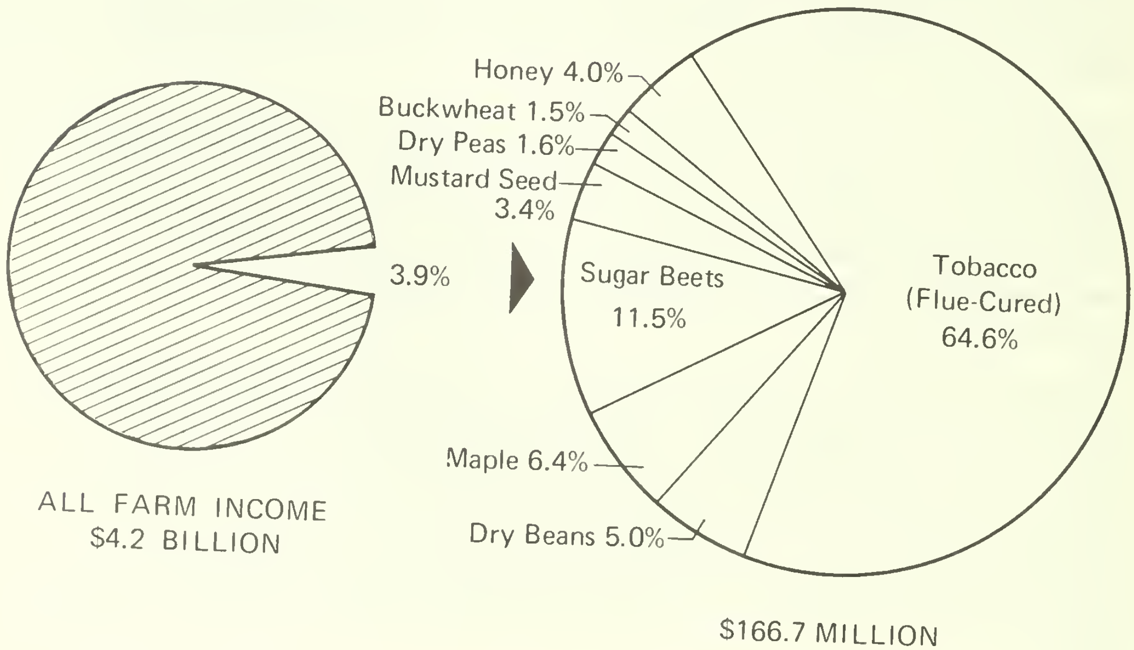
The export value of dried beans has increased in recent years and amounted to 17 percent of the 1976 total exported value of other crops. This increase in importance is primarily due to increased prices for dried beans brought on by recent world shortages and increased world demand for protein. However, this commodity is very responsive to world conditions, and price and supply can swing up and down as the world situation dictates.

Increased exports of refined sugar to the United States during 1975 and 1976 have been an important development totalling $23 and $17 million, respectively. This situation resulted from differences in pricing policies for refined sugar and the recent world shortage of sugar. Future shipments of such magnitude and value might be short lived as the United States is realigning its domestic sugar policy and the world importers and exporters of sugar meet to negotiate a new International Sugar Agreement during 1977.

FIGURE 21.1 DISTRIBUTION OF OTHER CROPS BY AREA, CANADA, 1950 – 1974 AVERAGE



DISTRIBUTION OF OTHER CROPS BY FARM INCOME, CANADA, 1950 – 1974 AVERAGE



Source: Statistics Canada, Cat. 21–003.

Table 21.1 AREA AND VALUE OF OTHER CROPS, CANADA, 1970-1974 AVERAGE

Other Crops	Area	Total Value	Value/hectare
	hectares	$000	$
Buckwheat	42,940	3,664	85.33
Dry Beans	51,320	24,374	474.94
Dry Peas	30,680	5,171	168.55
Honey	427,552[a]	16,207	37.91[b]
Maple Products	-	12,481	-
Mustard	96,177	11,966	124.42
Sugar Beets	29,420	28,378	964.58
Tobacco	44,819	172,596	3,850.96
Sub-total	295,356	274,837	833.40[c]
Total Cropped Land	37,451,000	6,707,000,000	179.09

[a]Number of colonies.
[b]Value per colony.
[c]Excludes farm value of honey and maple products.

Source: Statistics Canada, Cat. 21-003.

Table 21.2 DISTRIBUTION OF OTHER CROPS BY QUANTITY IMPORTED AND EXPORTED, CANADA, 1950-1974 AVERAGE

	Imports	%	Exports	%
	tonnes		tonnes	
Buckwheat	-	-	12,287	10.20
Honey	1,024	0.13	2,367	1.97
Maple Products	21	-	6,377	5.29
Sugar	761,110	98.27	14,319	11.89
Mustard Prepared	311	0.04	-	-
Mustard Seed	-	-	36,121	29.99
Dried Beans	4,940	0.64	16,680	13.85
Dried Peas	4,680	0.60	12,040	10.00
Tobacco	2,444	0.32	20,260	16.82
Total	774,530	100.00	120,451	100.00

Source: Statistics Canada, Cat. 65-202.

Table 21.3 DISTRIBUTION OF OTHER CROPS BY VALUE IMPORTED AND EXPORTED, CANADA, 1950-1974 AVERAGE

	Imports	% of Total	Exports	% of Total
	$000		$000	
Buckwheat	-	-	1,116	1.93
Honey	412	0.42	1,352	2.34
Maple Products	12	0.01	5,626	9.75
Mustard Seed	-	-	5,120	8.87
Mustard Prepared	293	0.30	n.a.	n.a.
Dried Beans	1,127	1.14	4,162	7.21
Dried Peas	206	0.21	1,556	2.70
Sugar	88,691	89.58	3,328	5.77
Tobacco	8,263	8.35	35,437	61.42
Total	$99,009	100.00	$57,698	100.00

Source: Statistics Canada, Cat. 65-202.

Imports of other crops averaged $99 million during the 1950-74 period (Table 21.3). Raw sugar and sugar products, and tobacco and tobacco products accounted for 90 and 8 percent, respectively, of the total imports. Sugar is the most important item because Canada imports 90 percent of its domestic requirements from the free world market. During 1950-74, total imports of sugar (raw equivalent) averaged 760 thousand tonnes and were valued at $89 million per year. However, the price of sugar during this period fluctuated drastically according to shortages and oversupply on the world market. The world market price for raw sugar peaked at

$1,430 per tonne during late 1974 and early 1975, declined throughout 1975 and stabilized in 1976 at about $220 per tonne. Sugar imports reached an all-time high of 939 million kilograms in 1975.

21.2 BUCKWHEAT

During the 1960's, buckwheat production shifted from Eastern Canada, where it was grown as a cover crop, to Manitoba (65 percent of all production) as a cash crop. It is popular because of its short growing season (10-12 weeks) and the fact that it will grow under a wide range of climatic and soil conditions.

The major portion of Manitoba buckwheat is produced for the Japanese market and Canadian export sales increased from 8.3 thousand tonnes during 1950-54 to 27.8 thousand tonnes during 1970-74. Seventy percent of the crop is exported unprocessed (Figure 21.2). In 1974, Agriculture Canada developed the Mancan variety at the Morden Research Station to meet export demand for a large-seeded buckwheat. The Japanese mix of buckwheat and durum wheat flour, which is used to make a spaghetti-like noodle called 'soba', is a popular lunch dish served with a vegetable or meat broth.

The Manitoba Buckwheat Growers Cooperative, formed in 1974, operates through the Manitoba Agricultural Marketing Commission who contracts directly with the Mitsubishi Corporation of Japan.

21.3 HONEY

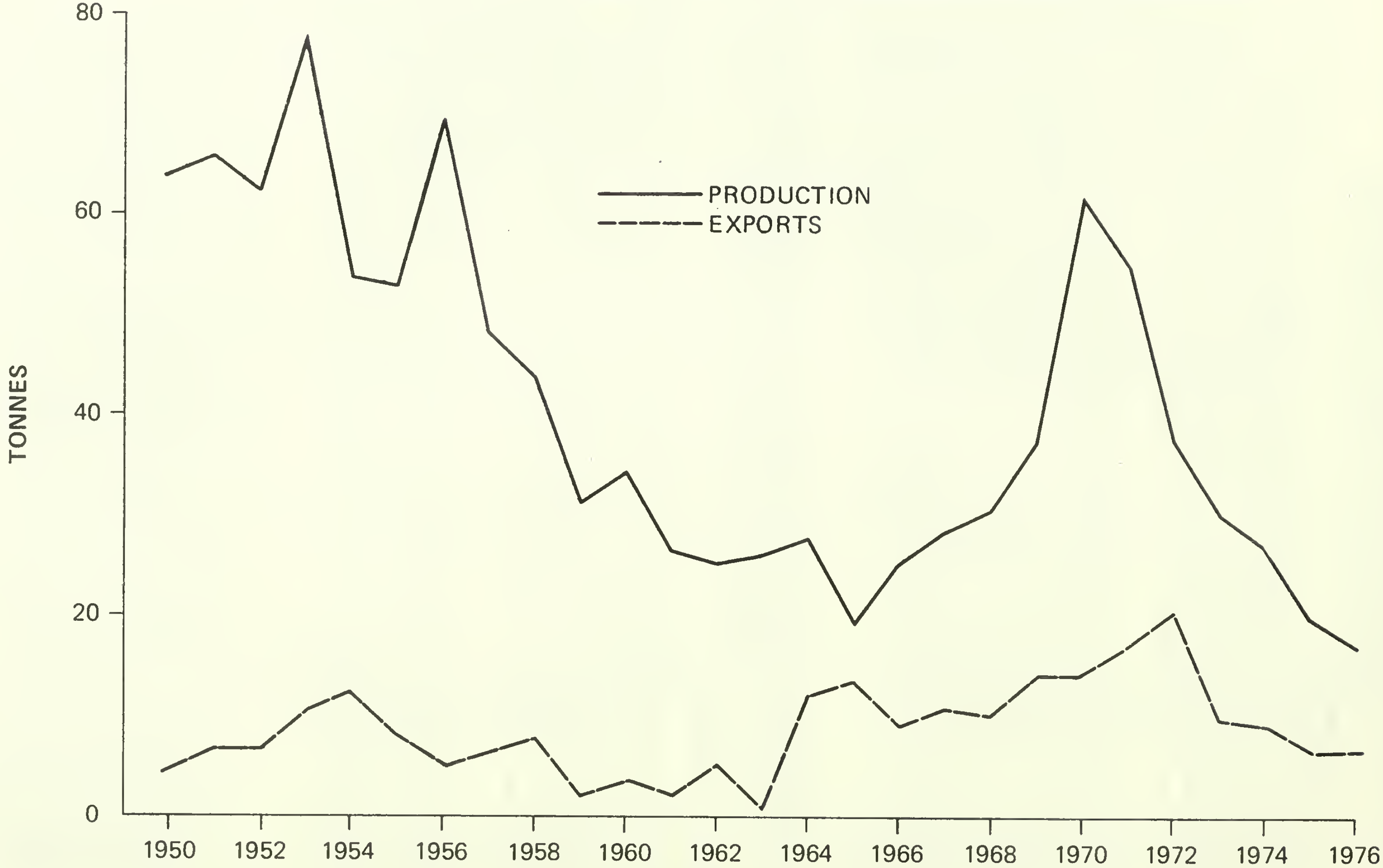
The number of beekeepers in Canada has declined steadily from 1950 until the past three years when there was an upturn. The number of colonies and the annual production, on the other hand, have increased steadily over the past twelve years. Production of honey during the five-year period 1971-75 averaged 22.6 million kilograms, valued at $16 million (Figure 21.3).

Imports of honey generally have decreased in volume over the past ten years while exports have increased. This trend, however, has been reversed in the last three years, and world production and supplies of honey remain at a high level. Average 1971-75 exports of honey stood at 6.7 million kilograms while average imports were 495 million kilograms.

21.4 MAPLE PRODUCTS

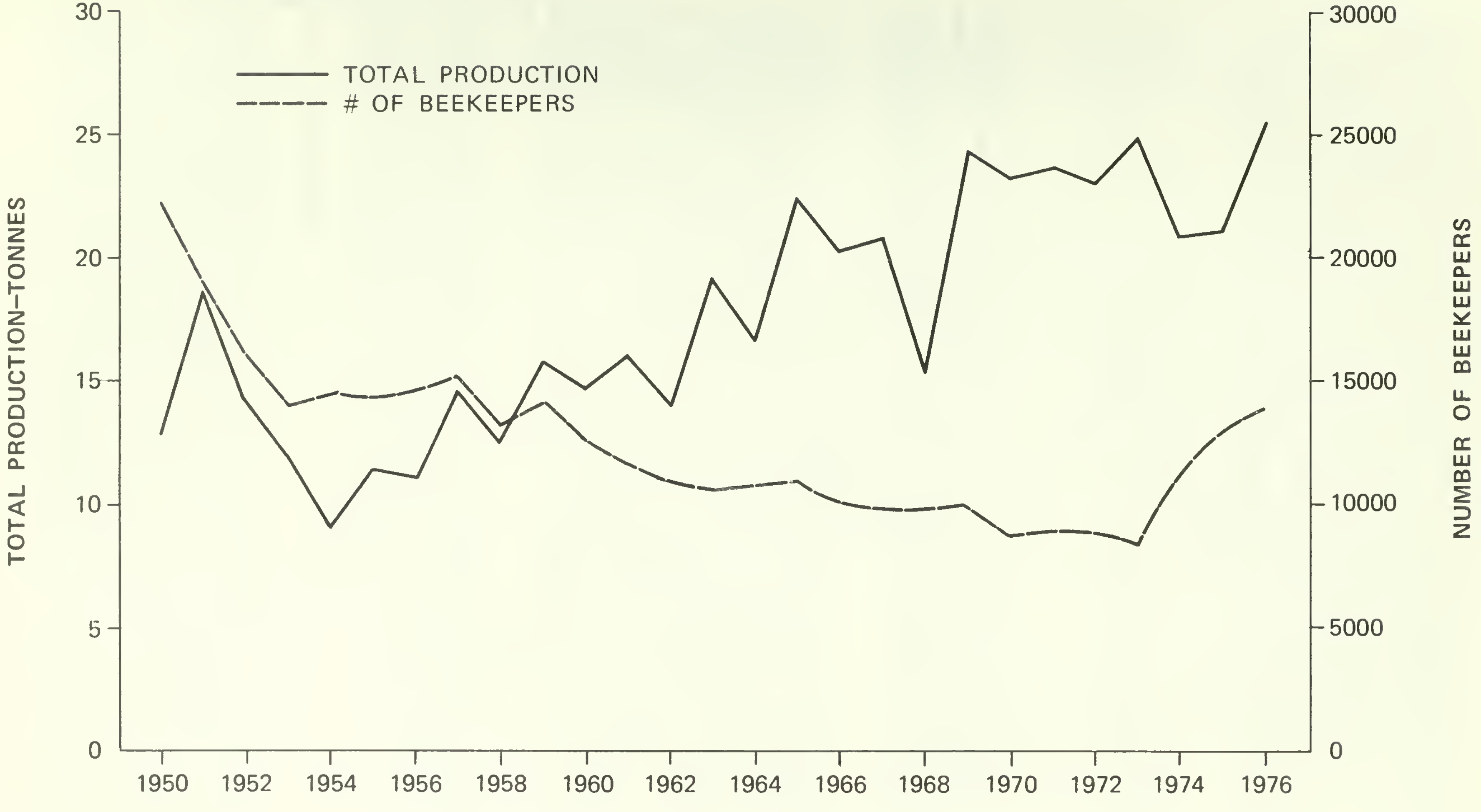
While the production output of maple products has declined sharply during the past seven years, the total farm value has remained about the same. However, the producer has not benefitted from the higher prices received for maple products as the difference has been absorbed by the higher production costs. During 1971-75, production averaged 8.2 million litres of maple syrup, 136 thousand kilograms of maple sugar and 182 thousand kilograms of maple taffy, with a total farm value of $12.5 million (Table 21.4).

FIGURE 21.2 **PRODUCTION AND EXPORTS OF BUCKWHEAT, CANADA, 1950 to 1976**



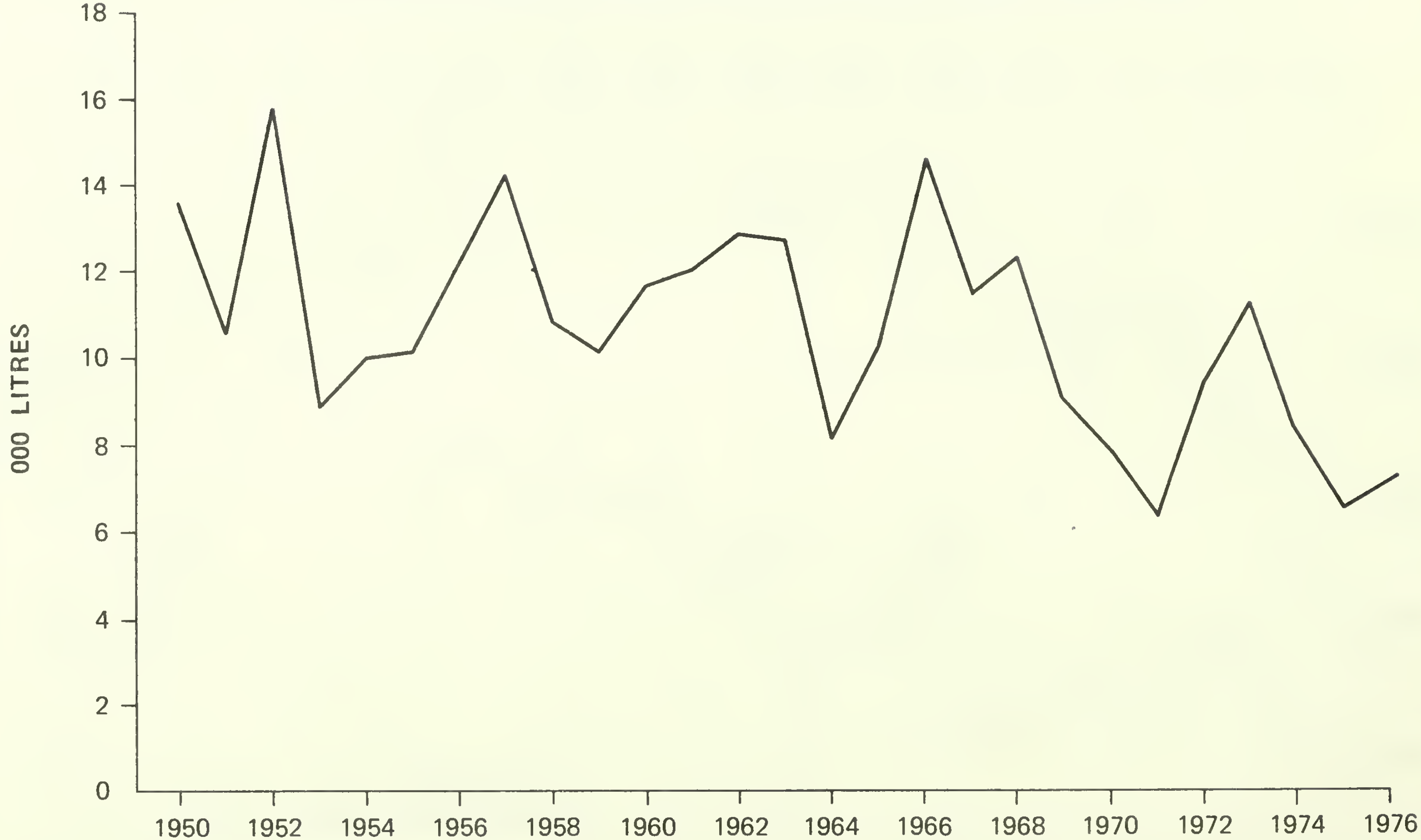
Source: Statistics Canada, Cat. 22–201.

FIGURE 21.3 NUMBER OF BEEKEEPERS AND TOTAL PRODUCTION OF HONEY, CANADA, 1950 to 1976



Source: Statistics Canada, Cat. 23–209.

FIGURE 21.4 **MAPLE PRODUCTS[a] PRODUCTION, CANADA, 1950 to 1976**



a Syrup, Sugar and Taffy.
Source: Statistics Canada, Cat. 22–204.

Canada produces two-thirds of the world supply of maple products. Commercial production is confined to the southeastern regions of Canada and the northeastern regions of the United States. Exports, mainly to the United States, have fallen since 1970 due to less maple syrup being used there for blending with other products. Previously, about half of the annual Canadian production was exported, and the reduction of this market has aggravated the domestic situation. At present, the maple industry is organizing at the international level in an attempt to develop new markets and promote the use of pure maple products.

Exports of maple products during 1970-74 averaged 27.3 million litres of maple syrup and 1.1 million kilograms of maple sugar, accounting for about 60 percent of the total Canadian production.

21.5 MUSTARD SEED

Only yellow mustard is grown in Ontario and Manitoba, whereas Saskatchewan and Alberta produce yellow, brown and oriental mustards. The oriental type is favored over brown mustard. These two Brassica juncea species together equal the production of yellow mustard (B. hirta). Average annual value of production (1970-74) was $9.4 million (Table 21.5).

A large portion of the mustard seed is grown under contract and about 60 percent of the crop is exported annually. Yellow mustard finds its major market in the United States, brown mustard in France, and oriental mustard in other EEC countries and in Japan. At one time, Canada was the world's leading supplier of mustard of all types. However, other countries resume production from time to time, often with serious effects on the market. Canada, therefore, cannot relax its efforts to improve seed quality and production efficiency. Yellow mustard is not solely used as a condiment but also as a source of oil and meal for animal feed, as well as a source of a protein and a thickening agent for human food.

Prepared mustard shipments to all industries in Canada increased from an average 3.2 million kilograms during 1950-54 to an average 10.9 million kilograms during 1970-74. Pricing of prepared mustard for the same period of time increased two-fold from 23 cents per kilogram to 46 cents per kilogram.

21.6 NEW CROPS

A new crop may be one that is well established in a particular region of Canada but is being introduced into another area where it is not been grown commercially before, e.g., soybeans in the Maritimes or on the prairies, or peanuts in Southwestern Ontario. Alternatively, it may be a crop such as sorghum which is not grown commercially in Canada. With both these types of new crops, production may be developed on a large scale. A third possibility is that of a specialty crop which would give a high return to a

FIGURE 21.5 **PRODUCTION AND EXPORTS OF MUSTARD SEED, CANADA, 1951 to 1976**

Source: Statistics Canada, Cat. 21–507.

few farmers, e.g., Jerusalem artichoke, chicory, monarda, fennel and dill.

Soybean cultivars of low heat unit requirement are now yielding well in Manitoba, non-traditional regions of Ontario, and in the Maritime Provinces. Licensed varieties will soon be available. Several sorghum varieties have recently been licensed and this crop could find a place in the drier prairie regions. Triticale, a hybrid of rye and wheat, is another crop for arid regions. However, no variety has yet been licensed in Canada and there is at present no commercial production.

Lentils, colored beans, lupins, azuki and mung beans have all yielded reasonably well in southern Manitoba and in the Brooks-Lethbridge region of Alberta. Small-scale commercial production for a limited market is practicable. Fababeans yield well in certain regions and are attractive as a silage crop.

Jerusalem artichoke also has high silage yields per hectare as well as producing useful quantities of fructose from its roots. Chicory root is also a source of fructose. Moreover, the coffee industry uses chicory in its blends. Both Jerusalem artichoke and chicory are close to commercial production.

Essential oil crops, such as dill and coriander are now grown and offer good return to a few farmers. Other specialty crops, including monarda, horseradish, sage, summer savory, fennel, anise, peppermint and sweet basil, have potential but are not yet produced commercially.

21.7 PULSES

21.7.1 Dry Peas

At the turn of this century, Canada has about ten times as much land in dry pea production as at present. During the period 1970-74, an annual average of 30,680 hectares of peas yielded 46,050 tonnes. Manitoba was the leading province, with 61 percent of the area, followed by Alberta with 27 percent. This land area is comparable to that used for crops like sunflowers or sugar beets. They have an annual value of $4.2 million.

In 1971, world production of dry peas was 10 million tonnes on 9 million hectares, the People's Republic of China and the USSR being the largest producers with about 3 million hectares each. The United States production is about 140 thousand hectares, 90 percent of which is located in the states of Washington and Idaho.

For the five-year period 1970-74, Canadian exports were 19.3 thousand tonnes, or 42 percent of domestic production. Although these exports are not large relative to world standards, they have a very substantial impact on our domestic pea industry. The greatest portion of them went to the United Kingdom.

Pea production is suited to areas which are too cool and have too short a growing season for crops like soybeans. Peas are used for human food and livestock feed. A protein content of about 23 percent makes peas a good protein-rich feed for livestock. For human consumption, peas are used mostly in soups, but with recent research and technology, there is the possibility of separating out pea starch and pea protein concentrate on a commercial basis. These added uses could result in some expanded production. During 1950-74, per-capita disappearance of dry peas averaged 1.03 kilograms and has trended downward from 1.1 kilogram per capita in 1950-54 to 0.91 kilogram per capita in 1970-74.

Producers generally contract their seeded area with a processing firm to be assured of a market, but there are some who produce on speculation and then make cash sales after the crop is harvested.

21.7.2 Dry Beans

The white pea bean or navy bean is the most important type of dry bean in Canada (95 percent of all Canadian production). Production has been steadily increasing since 1950; it reached an average of 78.3 thousand tonnes valued at $24.4 million from 51.3 thousand hectares per year during the period 1970-74. Almost all of this production was in Ontario with minor quantities in Quebec, Alberta and Manitoba. During this same period, Canada imported an average of 6.6 thousand tonnes of beans annually, but exported five times that amount or 35,700 tonnes. In 1974, world production was 11.5 million tonnes on 23 million hectares.

Beans require a growing season with considerable heat, and therefore are suited to only the southern portions of the provinces. The white beans are used primarily in 'pork and beans', or for baked bean dishes. Lower grade beans are often used for animal feeds. In the near future, there is likely to be little increase in demand for beans over and above population increases.

Growers in Ontario market their product through the Ontario Bean Producers' Marketing Board which sells all the beans and pools the prices for each grade. It is also able to coordinate promotion and market development as well as regulate interprovincial and export trade involving Ontario-grown white and yellow-eye beans. Beans grown in other provinces are grown both under contract and on speculation.

The per-capita disappearance of dry beans averaged 1.30 kilograms during the 1950-74 period and has remained fairly steady over this period. There have been yearly fluctuations from a low in 1954 of 0.54 kilograms per capita to a high of 2.55 kilograms per capita in 1966. The main consumption for dry beans has traditionally been in the form of canned baked beans and per-capita disappearance averaged 2.71 kilograms during the 1950-74 period. Disappearance over this time period has declined from 2.88 kilograms per capita during 1950-54 to 2.45 kilograms per capita during 1970-74. Much of the decreased per-capita consumption is attributed to higher income levels of Canadian consumers and the lack of innovations to adapt dry beans for the fast-food industry. A major campaign has been undertaken in Ontario to help encourage consumers to eat more beans, and an extensive program has been developed to inform the average Canadian homemaker on the preparation, cooking and nutritional aspects of using dry beans as a food.

21.8 SUGAR BEETS

Domestically-grown sugar beets provide about 11 percent of the one million tonnes (raw value 96° polarization) of sugar consumed in Canada, while the remaining 89 percent is derived from imports. Sugar beets are grown and processed in Alberta, Manitoba and Quebec. The two refineries in Alberta (at Taber and Picture Butte) and the one in Manitoba (at Fort Garry) are owned by British Columbia Sugar Refinery Ltd. These three process sugar for the prairie market. The plant in Quebec (at St. Hilaire) is owned and operated by the provincial government. Limited quantities of sugar beets are also being produced in New Brunswick and Prince Edward Island for export to the United States (Maine). Ontario production of sugar beets ceased in 1967 when the refinery at Chatham closed down. Production generated an average farm value of $19 million during the 1950-74 period. In recent years, production has increased as a result of high world prices for raw cane, and during 1970-74 averaged $28.4 million.

Canadian refined beet sugar is marketed domestically in direct price competition with refined cane sugar. Geographic considerations provide a degree of protection for the prairie market from cane sugar which is refined in Eastern Canada and British Columbia.

In all five provinces, beets are grown under contract to the refinery. The returns received by growers depend on the international market price for raw cane sugar. Prairie beet growers receive 63 percent of the proceeds from the sale of refined beet sugar plus a payment for by-products. In periods of low world prices, this has meant that returns have been minimal and were supplemented by deficiency payments as prescribed under the Agricultural Stabilization Act of 1958. Growers in Quebec are guaranteed a minimum price for their beets and also receive a bonus if favourable market conditions prevail.

Canada's seven cane sugar refineries are located in Vancouver, Montreal (3), Oshawa, Toronto and Saint John. The refinery industry has traditionally operated in an environment of excess capacity. Total annual capacity is rated at 1.3 thousand tonnes per day while only 964 tonnes per day is utilized. This excess is largely concentrated in two plants. During the last 15 years, the number of workers employed in the refineries has declined from about 3,200 to 2,700 workers, while the value added has increased from $44 million to $80 million.

Per-capita disappearance of sugar during the 1950-74 period averaged 44.0 kilograms and has increased to 45.7 kilograms during the 1970-74 period. Per-capita disappearance dropped off in 1974 and 1975 as a result of high retail prices of sugar to about 41.5 kilograms in each year. The utilization of sugar for domestic disappearance is split, about 60 percent going for manufactured items and 40 percent for direct home use (Table 21.6).

Canada was a signatory to the International Sugar Agreement of 1968 which contained provisions covering import and export commitments and pricing arrangements. That agreement expired at the end of 1973 and was replaced by a new agreement with no economic terms. Supplies of raw cane for domestic refining are purchased on the 'free world market' - mainly from Australia and South Africa. Since Canada is a relatively small participant in this, Canadian refiners are price takers; however, the residual nature of the market makes it very volatile. Unpredictable variations in supply, impinging on a market where demand is relatively stable, tends to produce wide price fluctuations.

21.9 TOBACCO

Tobacco is one of the most important cash crops in Canada. Production of all types since 1950 has increased 55 percent to a present average of 104 thousand tonnes during 1970-74. Flue-cured tobacco is the major type grown, and at present accounts for 97 percent of the production.

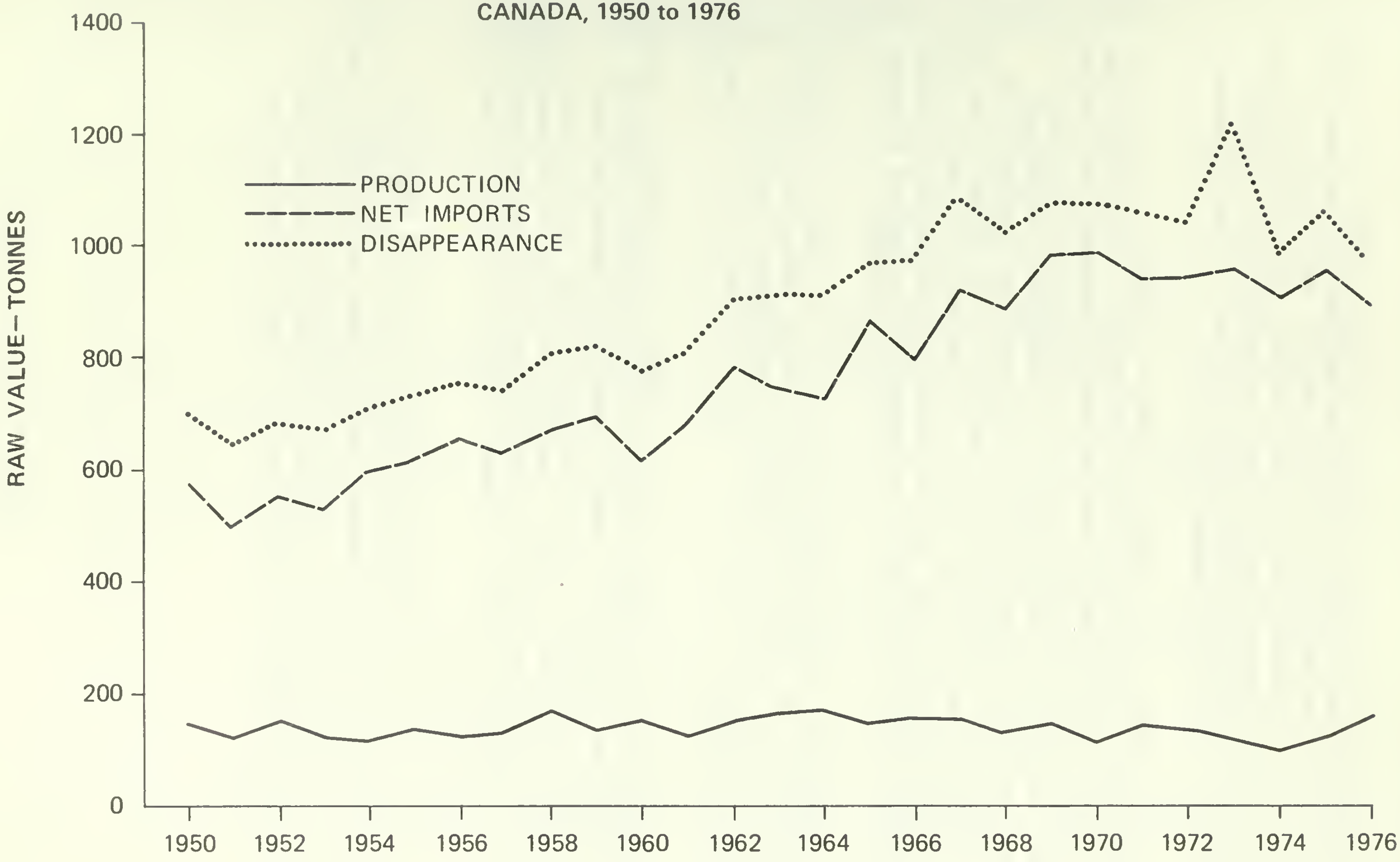
Tobacco is produced and marketed in Ontario (flue-cured, burley and dark), Quebec (flue-cured, cigar and pipe) and the Maritimes (flue-cured). Ontario, Quebec and the Maritimes market 88.8, 6.7 and 4.4 percent, respectively, of the flue-cured crop.

There are six tobacco marketing boards and one association that set and coordinate the production and marketing of all tobacco in Canada. The Ontario Flue-cured Tobacco Growers' Marketing Board negotiates with the Canadian Tobacco Manufacturers Council to produce a specified quantity of tobacco for a minimum guaranteed price. Once the crop is harvested, the tobacco is delivered to one of three auctions for sale, using the 'dutch clock' selling method.

The Quebec Flue-cured Tobacco Producers' Board negotiates a floor price linked to the final Ontario price, and the tobacco is then auctioned on a crop basis at a one-day auction held in the fall. In the Maritimes, the minimum crop price (linked with Ontario's final price) is negotiated with the buyers and the tobacco is sold during October through bids made to individual growers for their crop.

Because of high labour costs and a lack of adequate seasonal labour, many growers have been switching to mechanical harvesters and bulk curing barn systems. Similarly, with energy conservation being of prime importance, many technological advancements have

FIGURE 21.6 **DISAPPEARANCE, PRODUCTION AND IMPORTS OF SUGAR, CANADA, 1950 to 1976**



Source: Statistics Canada, Cat. 32–222.

been developed and implemented in order to save energy during the curing process.

Canada's share of the world flue-cured tobacco market is approximately seven percent. Canadian exports have averaged about 30 percent of the domestic production during the 1960's and 1970's. Since Canada's major export market, the United Kingdom, joined the EEC, exports have dropped off considerably. Recent increases in taxation of tobacco products has further depressed exports to the United Kingdom (Table 21.7).

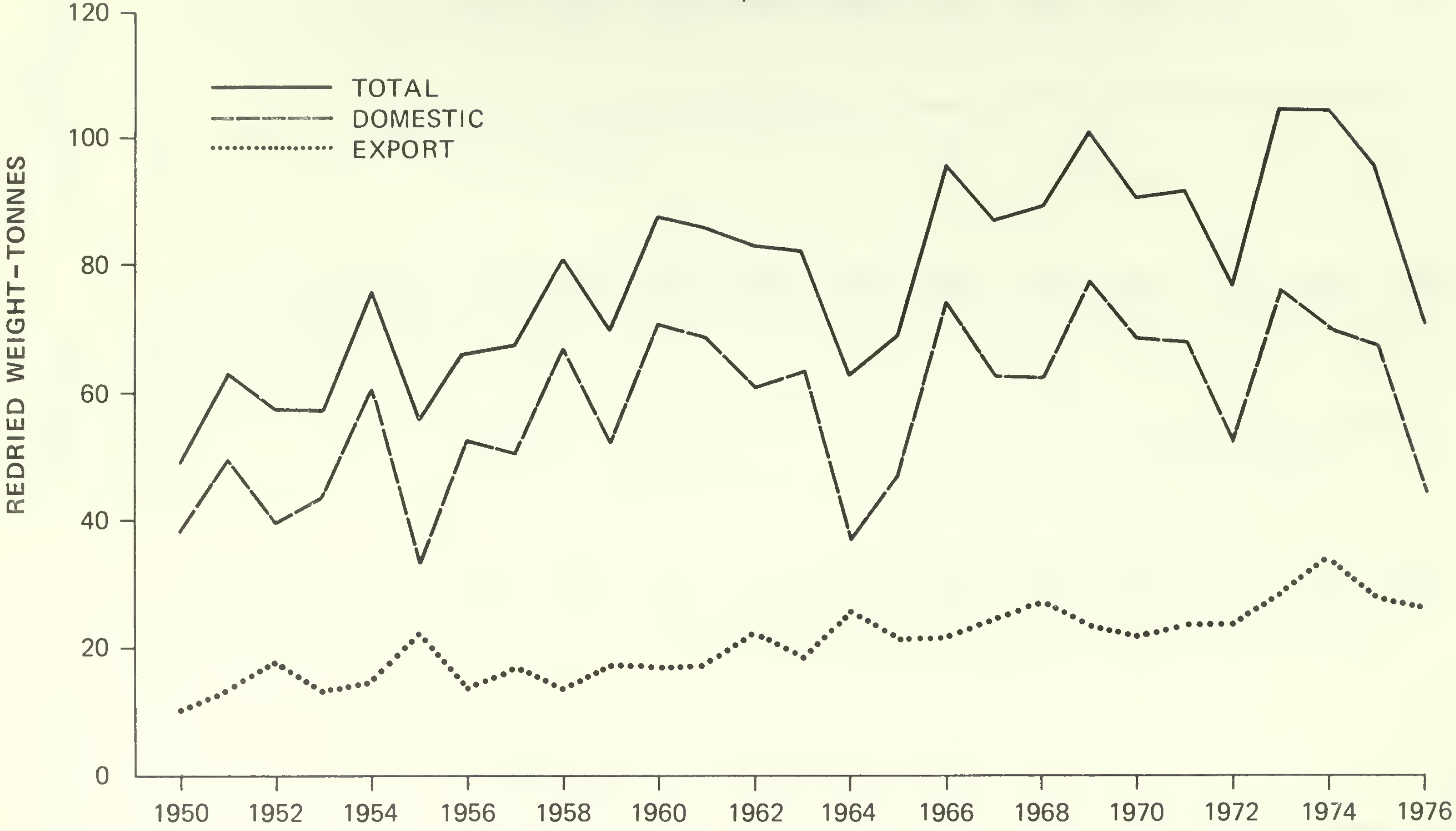
About 70 percent of the production used domestically is in the manufacture of cigarettes and fine cut tobacco for cigarette use. During the last 25 years, these has been a downward trend in the amount of flue-cured tobacco used in the manufacture of cigarettes. During the 1950-54 period, 1.95 kilograms of redried tobacco was used to manufacture 1,000 cigarettes compared with 0.96 kilograms during the 1970-74 period. This is partly due to the increased use of filter tips on cigarettes and technological advancements made in leaf processing and manufacturing techniques. During this period, per-capita consumption of cigarette tobacco stayed relatively constant at 3.5 kilograms per capita (Table 21.8).

The processing and manufacturing sector of the tobacco industry provides jobs for about 3,000 people. Three processing plants in Quebec and five in Ontario handle all the tobacco produced in Canada. In addition, there are 11 manufacturing plants in Quebec and six in Ontario.

The manufacture and sale of tobacco products is a multi-million dollar operation in Canada controlled by a very small group of multi-national companies. Domestic sales of cigarettes have increased at an annual rate of 5.2 percent from 17.2 billion in 1950 to 57.1 billion in 1974. However, this rate of increase has been slowing down and since 1964 the annual rate has averaged 2.95 percent. In 1975 and 1976, cigarette sales totalled 57.8 and 60.7 billion, respectively.

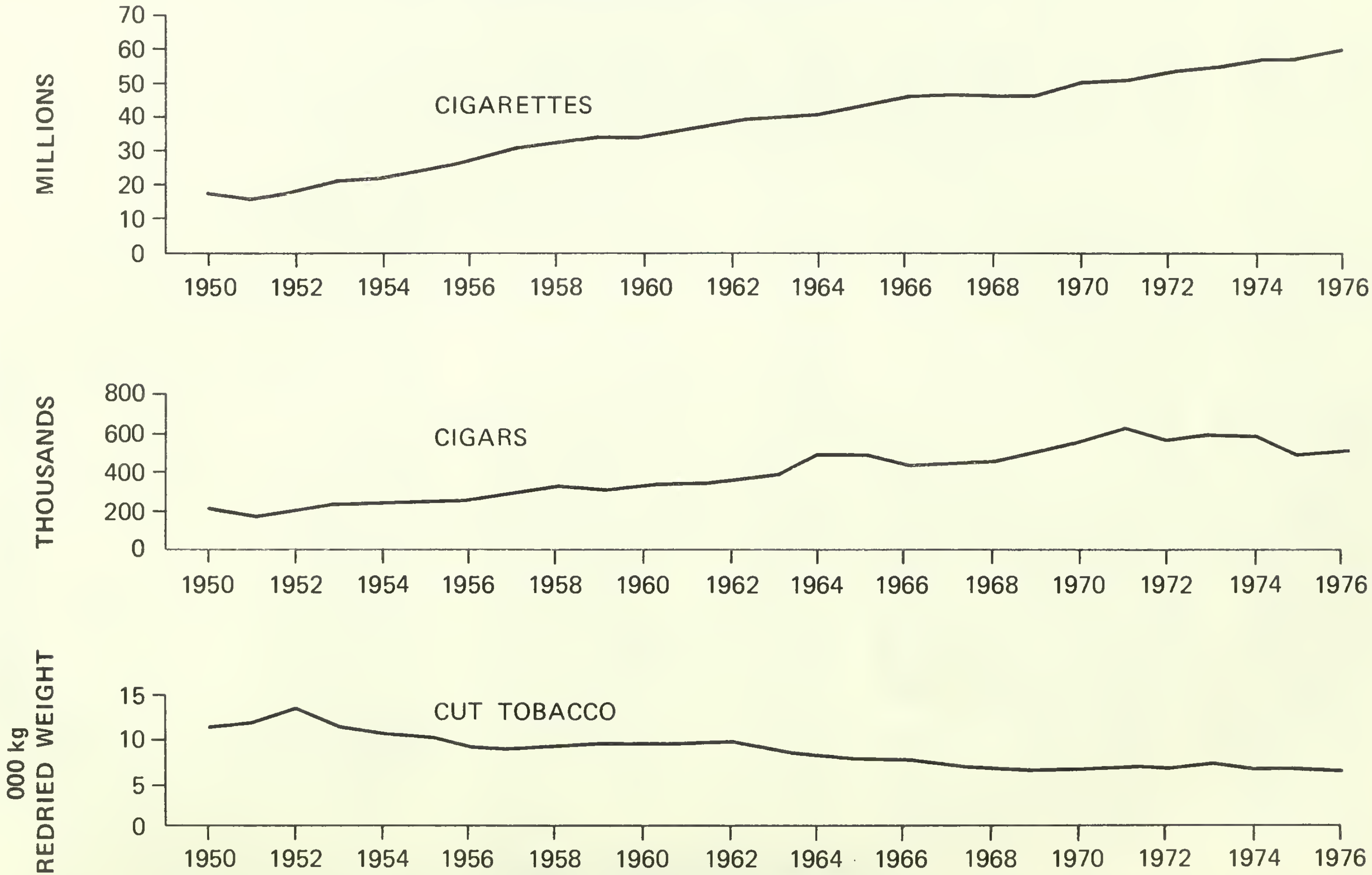
During the 1950-76 period, the producers' share of the retail dollar spent on cigarettes has decreased from about 12 percent down to 6 percent. The tobacco producers have maintained a viable production unit, however, because of technological developments made in tobacco breeding to improve the yield per hectare and economies of production associated with large production and curing units.

FIGURE 21.7 **TOTAL CANADIAN TOBACCO SALES, DOMESTIC AND EXPORT SHARES, 1950 to 1976**



Source: Statistics Canada, Cat. 32–014 & 32–225.

FIGURE 21.8 **DOMESTIC SALES TRENDS OF CIGARETTES, CIGARS AND CUT TOBACCO, CANADA, 1950 to 1976**



Source: Statistics Canada, Cat. 32–014 & 32–225.