Processed Forage

INDUSTRY PROFILE

Industry, Science and Technology Canada
Industrie, Sciences et Technologie Canada

Business Service Centres / International Trade Centres

Industry, Science and Technology Canada (ISTC) and International Trade Canada (ITC) have established information centres in regional offices across the country to provide clients with a gateway into the complete range of ISTC and ITC services, information products, programs and expertise in industry and trade matters. For additional information contact any of the offices listed below.

Newfoundland

Atlantic Place
Suite 504, 215 Water Street
P.O. Box 8950
ST. JOHN'S, Newfoundland
A1B 3R9
Tel.: (709) 772-ISTC
Fax: (709) 772-5093

Prince Edward Island

Confederation Court Mall
National Bank Tower
Suite 400, 134 Kent Street
P.O. Box 1115
CHARLOTTETOWN
Prince Edward Island
C1A 7M8
Tel.: (902) 566-7400
Fax: (902) 566-7450

Nova Scotia

Central Guaranty Trust Tower
5th Floor, 1801 Hollis Street
P.O. Box 940, Station M
HALIFAX, Nova Scotia
B3J 2V9
Tel.: (902) 426-ISTC
Fax: (902) 426-2624

New Brunswick

Assumption Place
12th Floor, 770 Main Street
P.O. Box 1210
MONCTON, New Brunswick
E1C 8P9
Tel.: (506) 857-ISTC
Fax: (506) 851-6429

Quebec

Tour de la Bourse
Suite 3800, 800 Place Victoria
P.O. Box 247
MONTREAL, Quebec
H4Z 1E8
Tel.: (514) 283-8185
1-800-361-5367
Fax: (514) 283-3302

Ontario

Dominion Public Building
4th Floor, 1 Front Street West
TORONTO, Ontario
M5J 1A4
Tel.: (416) 973-ISTC
Fax: (416) 973-8714

Manitoba

8th Floor, 330 Portage Avenue
P.O. Box 981
WINNIPEG, Manitoba
R3C 2V2
Tel.: (204) 983-ISTC
Fax: (204) 983-2187

Saskatchewan

S.J. Cohen Building
Suite 401, 119 - 4th Avenue South
SASKATOON, Saskatchewan
S7K 5X2
Tel.: (306) 975-4400
Fax: (306) 975-5334

Alberta

Canada Place
Suite 540, 9700 Jasper Avenue
EDMONTON, Alberta
T5J 4C3
Tel.: (403) 495-ISTC
Fax: (403) 495-4507

Suite 1100, 510 - 5th Street S.W.
CALGARY, Alberta
T2P 3S2
Tel.: (403) 292-4575
Fax: (403) 292-4578

British Columbia

Scotia Tower
Suite 900, 650 West Georgia Street
P.O. Box 11610
VANCOUVER, British Columbia
V6B 5H8
Tel.: (604) 666-0266
Fax: (604) 666-0277

Yukon

Suite 301, 108 Lambert Street
WHITEHORSE, Yukon
Y1A 1Z2
Tel.: (403) 668-4655
Fax: (403) 668-5003

Northwest Territories

Precambrian Building
10th Floor
P.O. Bag 6100
YELLOWKNIFE
Northwest Territories
X1A 2R3
Tel.: (403) 920-8568
Fax: (403) 873-6228

ISTC Headquarters

C.D. Howe Building
1st Floor East, 235 Queen Street
OTTAWA, Ontario
K1A 0H5
Tel.: (613) 952-ISTC
Fax: (613) 957-7942

ITC Headquarters

InfoExport
Lester B. Pearson Building
125 Sussex Drive
OTTAWA, Ontario
K1A 0G2
Tel.: (613) 993-6435
1-800-267-8376
Fax: (613) 996-9709

Publication Inquiries

For individual copies of ISTC or ITC publications, contact your nearest Business Service Centre or International Trade Centre. For more than one copy, please contact

For Industry Profiles:
Communications Branch
Industry, Science and Technology Canada
Room 704D, 235 Queen Street
OTTAWA, Ontario
K1A 0H5
Tel.: (613) 954-4500
Fax: (613) 954-4499

For other ISTC publications:
Communications Branch
Industry, Science and Technology Canada
Room 208D, 235 Queen Street
OTTAWA, Ontario
K1A 0H5
Tel.: (613) 954-5716
Fax: (613) 954-6436

For ITC publications:
InfoExport
Lester B. Pearson Building
125 Sussex Drive
OTTAWA, Ontario
K1A 0G2
Tel.: (613) 993-6435
1-800-267-8376
Fax: (613) 996-9709

Canada

18M

(V 6.91.11)

INDUSTRY PROFILE

1990–1991

PROCESSED FORAGE

FOREWORD

In a rapidly changing global trade environment, the international competitiveness of Canadian industry is the key to growth and prosperity. Promoting improved performance by Canadian firms in the global marketplace is a central element of the mandates of Industry, Science and Technology Canada and International Trade Canada. This Industry Profile is one of a series of papers in which Industry, Science and Technology Canada assesses, in a summary form, the current competitiveness of Canada's industrial sectors, taking into account technological, human resource and other critical factors. Industry, Science and Technology Canada and International Trade Canada assess the most recent changes in access to markets, including the implications of the Canada-U.S. Free Trade Agreement. Industry participants were consulted in the preparation of the profiles.

Ensuring that Canada remains prosperous over the next decade and into the next century is a challenge that affects us all. These profiles are intended to be informative and to serve as a basis for discussion of industrial prospects, strategic directions and the need for new approaches. This 1990–1991 series represents an updating and revision of the series published in 1988–1989. The Government will continue to update the series on a regular basis.

Michael H. Wilson
Minister of Industry, Science and Technology
and Minister for International Trade

Structure and Performance

Structure

The processed forage industry is composed of small firms that produce dried alfalfa pellets and cubes for animal feed. These products are made from forage (principally alfalfa) that has been either artificially dried (dehydrated) or sun-cured (field-dried). Dehydrated alfalfa pellets may be used in manufactured compound feeds for farm animals. Sun-cured pellets are often fed directly to livestock as a diet supplement without further processing. Alfalfa cubes (sometimes called hay cubes) are primarily used as a dietary source of fibre for cattle and horses. Related industry profiles have been prepared covering

- *Livestock and Poultry Feeds*
- *Pet Foods*

In 1989, an estimated 38 production establishments generated shipments worth over $100 million. Exports that year totalled $94 million and went mainly to Pacific Rim countries, primarily Japan. A shortage of agricultural land and large livestock populations have made Pacific Rim countries like Japan a strategic market for North American processed forage. Almost 90 percent of Canadian pellets and about 75 percent of cubes are exported. Most export sales, particularly of pellets, are co-ordinated by specialized marketing firms. Imports of pellets and cubes are negligible.

The industry is primarily owned and managed by Canadians. There is a nucleus of about 400 to 500 full-time jobs associated with the management, production, transportation and marketing functions. There is a strong seasonal component in labour requirements, which call for another 700 to 800 part-time jobs during peak production periods. The industry payroll is estimated at between $12 million and $13 million annually.

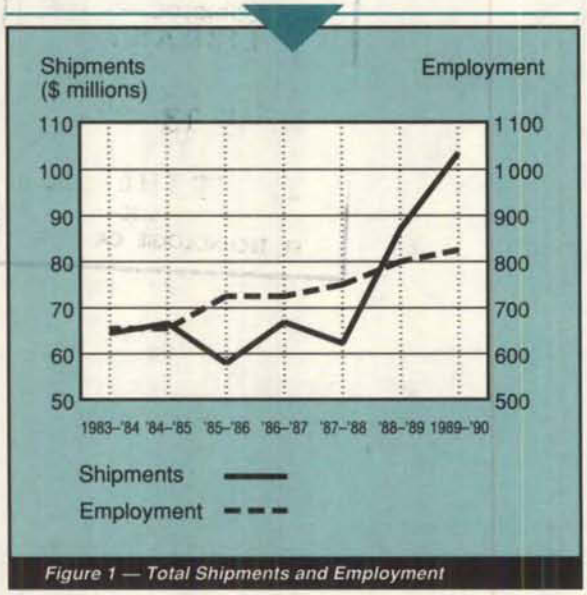

Figure 1 — Total Shipments and Employment

Production of pellets and cubes during the 1989–1990 crop year (1 June to 31 May) was estimated at 685 000 tonnes. Total pellet production consisted of approximately 325 000 to 350 000 tonnes of dehydrated alfalfa pellets and about 100 000 tonnes of sun-cured pellets. Alfalfa cubes (including minicubes) made up between 35 to 45 percent of production (or about 250 000 tonnes), most of which was produced in Alberta.

Most processed forage production occurs in Western Canada, with more than 75 percent of all industry plants and 85 percent of total production capacity located in Saskatchewan and Alberta. There are plants in all provinces, however, with the exception of those in Atlantic Canada (a plant in Prince Edward Island has been converted to fish meal production). Alfalfa pellet production is widespread across Canada, while cubes are produced mainly in Alberta, with small amounts manufactured in Manitoba, Saskatchewan and British Columbia. A new large cubing plant began preliminary operations in Ontario in 1990.

Industry firms vary in size, although the Ontario and Quebec companies making pellets tend to be small, producing between 2 000 to 4 000 tonnes annually, mostly for local feed mills. These firms together account for less than 10 percent of national production, or about 25 000 to 30 000 tonnes.

Western plants are much larger and currently produce an average of 15 000 to 20 000 tonnes each annually. The annual production capacity of Western Canadian plants ranges between 5 000 and 45 000 tonnes each.

Weather conditions dramatically influence alfalfa yields and hence overall industry production levels. Winterkill and drought conditions can affect the availability of raw plant material. On the other hand, too much rain during harvest also hampers processing operations. Weather factors, combined with the perishable nature of the product, require firms to make significant investments in storage facilities. The short production season and the need to supply products year-round make storage critical.

Value-added activity in the production process is fairly substantial; expressed as a percentage of the value of the finished product prior to shipment, value-added can be as high as 75 percent. Dryer fuels, labour and raw materials are the major variable processing costs.

Production costs are roughly similar for cubes and for sun-cured or dehydrated alfalfa pellets. Although dryer fuel costs are much lower for sun-cured products, savings are offset by the costs of baling, handling and storing of sun-cured materials until processing. Dehydrated alfalfa pellets are processed right after the forage is cut and hauled from the field, so there is no need for baling. Sun-cured alfalfa pellets normally sell for 10 to 15 percent less than dehydrated alfalfa pellets, which are considered a higher-quality product. Cubes can also be made from fresh-cut forage or from sun-cured materials. The quality of raw materials used has a direct impact on the quality and price of the finished product.

Performance

Alfalfa dehydration began in Eastern Canada in the late 1940s to serve local markets. A relatively stable local supply and demand situation developed and has remained unchanged since then. High energy and transportation costs keep Eastern Canadian export sales to a minimum. Confined largely to local domestic markets with stiff competition from other feedstuffs, production and sales of processed forage in Eastern Canada have remained static for the past 10 years.

Driven by successful export marketing, the processed forage industry in Western Canada, on the other hand, has grown rapidly (see Figure 1 for overall industry growth). In 1973, Canadian production (primarily pellet production at that time) totalled approximately 125 000 tonnes, while exports were estimated at 60 000 tonnes. By 1983, the industry was producing over 330 000 tonnes of pellets and, by 1988, the volume had grown to more than 430 000 tonnes. Cube production grew from just over 40 000 tonnes in 1981 to nearly 240 000 tonnes by the end of the 1980s. In the 1989–1990 crop year, total output attained 685 000 tonnes and exports reached 490 000 tonnes (Figure 2).

Not all firms shared in this expansion with equal success nor has this growth been evenly distributed from year to year. Production capacity at times has come on stream at faster

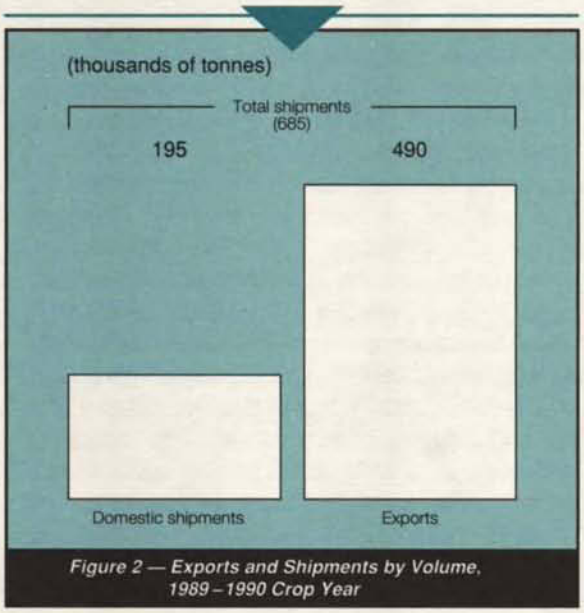

Figure 2 — Exports and Shipments by Volume, 1989–1990 Crop Year

rates than the market could absorb, while on other occasions weather conditions have limited raw material availability. The 1988 drought, for example, reduced raw material availability in Manitoba and Saskatchewan while firms in central and northern Alberta had considerable volumes of raw material available, enabling them to set production records that year.

Japan's strong, continuous economic growth over the past 15 years, with gradual adoption of Western-style livestock production and expansion of dairy and poultry output, has provided an important avenue for expansion of the Western Canadian processed forage industry. Canadian shippers have supplied over 95 percent of the Japanese alfalfa pellet market since 1986 and slightly over 20 percent of the cube market since 1989. The United States dominates the Pacific Rim cube market, particularly Japan's.

Canadian prices for alfalfa products (primarily pellets) are competitive with those of U.S. suppliers, and Canada has gradually become the major supplier of alfalfa pellets to Japan. The Japanese pellet market is about 250 000 to 300 000 tonnes in size and is not demonstrating any growth.

The Canadian share of the Japanese cube market up to 1986 did not exceed 6 percent, with exports around 40 000 to 50 000 tonnes. Since then, Canadian sales rose sharply, as some Japanese buyers have agreed that cubes could be shipped in bulk without using containers, by simply loading them into the hold of the ship. This change has reduced the shipping cost, although a significant proportion of Canadian cubes are still shipped by container. Canadian exports to the Japanese alfalfa cube market accounted for about 150 000 tonnes in 1989. After some vigorous growth in recent years, total Japanese imports of cubes slowed in 1990.

Since the Japanese pellet market is showing signs of maturing, attempts to develop other Pacific Rim markets, such as the Republic of Korea and Taiwan, are necessary to maintain pellet and cube sales at existing levels. Canadian forage exports to the Republic of Korea have performed well in this small but growing market, shipping 66 000 tonnes of pellets and cubes from 1987 to 1989. This compares with shipments of 14 000 tonnes from U.S. sources in the same three-year period.

Since 1988, Canadian forage exporters have achieved some success with the development and marketing of a new product known as the minicube. Although making it has required some innovative alterations to production equipment, this new product is beginning to develop a niche in the Japanese dairy industry as an alternative source of fibre to the conventional cube product.

In other new-product development areas, the Japanese dairy industry is rapidly developing as a market for forage products containing fibres longer than those found in a 0.5-centimetre-diameter pellet or a 2.5-centimetre cube. Systems to produce competing products with longer fibre lengths (5 to 15 centimetres) are being developed and tested but, to date, only on a fairly limited basis. Canadian shippers still have only a 1 to 2 percent share of this $100-million market, which is controlled by firms in the western United States. Rigid Japanese phytosanitary requirements are a major constraint for Canadian shippers. The United States, on the other hand, has negotiated a fumigation agreement with Japan that facilitates product shipment from that country.

Canadian sales of processed forage into the Western European market are limited because of distance, production costs (which rose in the 1970s with higher energy costs), competition from other feedstuffs and the complex feedstuff subsidy schemes provided under the European Community (EC) Common Agricultural Policy. While sales to the United States do occur, they are limited by that country's own production of processed forage as well as by competition from other feedstuffs produced there.

Although the Canadian domestic market is the industry's second largest, expansion of processed forage demand in Canada is hampered by pressure from competing feedstuffs. Widely available feed grains (corn and barley) and oilseed meals (soybean and canola), which Canada also produces, limit opportunities to sell alfalfa pellets. Competition from other fibres (corn silage, hay silage and baled hay) also constrains cube sales domestically.

In some years, the industry's before-tax profits have exceeded 10 percent of sales. Profits are volatile. They depend

on the supply and quality of inputs as well as on the price and supply of competing feed commodities (corn and soybean meal). Although other markets seem to be developing, heavy dependence on the single export market of Japan for only a few products still remains. This tends to add to the uncertainty and the fluctuations in profitability that occur from year to year.

Strengths and Weaknesses

Structural Factors

Key factors influencing industry performance include access to raw materials, energy and transportation costs, climatic conditions, the price and availability of competing products, and government policies affecting access to foreign markets.

The larger industry presence in Western Canada is due to certain regional advantages. Lower raw material and energy costs provide the industry with important low-cost inputs. In addition, lower land costs make western forage production more viable than that in other parts of Canada or the United States. For example, raw forage material usually costs less in northern Alberta and northeastern Saskatchewan than alfalfa grown under irrigation in southern Alberta, Eastern Canada or California.

Since drying costs are a major portion of total operating costs, the relatively cheap natural gas in Saskatchewan and Alberta is also an important advantage for Western Canadian producers. Energy shortages and high oil prices forced production declines in the EC, the United States and New Zealand in the 1970s. Deregulation of the Saskatchewan natural gas industry has resulted in lower natural gas prices during the past few years for Saskatchewan dehydrators.

Canadian production is more highly seasonal than that in the United States, where the milder climate permits a longer alfalfa growing season. The highly seasonal nature of alfalfa production and the limited demand for sun-cured pellets force Canadian plants to close for part of the year. Cubing operations continue for longer periods with stocks of baled hay. As well, the U.S. climate and the alfalfa varieties grown there allow portable cubing plants to produce a bright celery-green type of alfalfa cube that has become the preferred standard in Japan. The western U.S. processed forage industry relies heavily on government-subsidized irrigation to produce this type of product. In comparison, Canadian cubers have found that cubes made from forage material inputs derived from dry farming operations have not been as readily accepted by some Japanese buyers as those from irrigated production areas in the United States.

Although Canadian cubes do not resemble the U.S. product in appearance, they are comparable from a nutritional point of view.

In addition, the industry faces a number of transportation constraints. Processed forage sales are sensitive to freight rates. Many Canadian Prairie producers are farther from the Pacific Coast than some of the leading irrigated alfalfa-producing areas in the intermountain region of the western United States. Prairie plants are far from the large central Canadian market and, in the case of exports, a long way from all-season ocean shipping terminals. As a result, the inland transportation and handling components of export sales is high in relation to those of some U.S. suppliers, particularly for cube exporters that use containers. Canada is not on the major world trading routes, so transportation costs to many Latin American, European and African destinations are higher for Canada than for some competing nations. For example, costs are lower for U.S. shippers who use the Mississippi River system. Traditionally, these U.S. shippers have been more successful than Canadian operators in European and Latin American markets.

Container availability and handling costs have been more of a challenge for Canadian shippers than for their American counterparts. These transportation factors have constrained product diversification and industry development in Canada. Due to the larger U.S. economy and greater trade volumes, containers are available in greater numbers there. As well, the infrastructure for handling them tends to be better developed than in Canada, where shipments out of Vancouver tend to be bulk commodities (grain, coal, etc.). Greater use of bulk shipping for alfalfa cubes has helped to reduce but not eliminate the container shortages. The increased volume of bulk processed forage exports through Vancouver is beginning to put pressure on the existing handling and storage facilities there.

The inclusion of alfalfa pellets and cubes under the *Western Grain Transportation Act* (WGTA) has enabled Canadian shippers to offset some of their high rail transportation costs to ports. These same statutory provisions are available for other Canadian feedstuffs as well, so that these commodities (with which they are in direct competition in such world markets as Japan) have the same transportation cost advantage as pellets and cubes.

Canadian suppliers face a demanding and technical market in Japan, particularly for alfalfa pellets. Sophisticated Japanese trading houses, commodity buyers and feed companies constantly monitor the world market for prices and supplies of competing feedstuffs such as corn, corn gluten meal, soybean meal and others. Because these prices and supplies fluctuate sharply, Canadian dehydrators always face

unstable and uncertain market conditions. Since they form only a small part of the supply side of the Japanese feed market, Canadians must follow the price and technical trends of this market and best determine how to serve it.

At the time of writing, the Canadian and U.S. economies were showing signs of recovering from a recessionary period. The processed forage industry is export driven and was not as significantly affected as some other industries more heavily dependent on the domestic market for sales.

Trade-Related Factors

The EC has no customs tariffs on imports of processed forage products although variable import levies and other subsidy schemes have been set up to protect EC feedstuff production. Japan imports most feed ingredients, including processed forage products, duty-free. For trade between the United States and Canada, the remaining customs duties on forage products were eliminated in both countries upon the implementation of the Canada-U.S. Free Trade Agreement (FTA) on 1 January 1989. The Republic of Korea has a 15 percent ad valorem rate, whereas the import duty on many other competing feed ingredients is much less, putting processed forage at a competitive disadvantage.

Apart from the tariff problems in the Republic of Korea, other trade-related policies emanating from the EC and the United States have had a much greater impact on trade flows of processed forage and competing feedstuffs. In the EC, trade policies such as high, variable import levies and high export subsidies (together with protein self-sufficiency schemes from which domestic dehydrators benefit) have helped to make the EC a major feedstuff producer, thereby dramatically reducing imports from North America.

In response to EC initiatives, recent U.S. farm legislation and export policies have focused on making U.S. feedstuffs more attractive on international markets. While U.S. export subsidies such as those offered through the Export Enhancement Program are not available to the U.S. dehydrated alfalfa industry, agriculture policy in the United States has greatly influenced the supply and price of competing feed ingredients through a complex system of price supports and commodity loan programs. As a result, U.S. and worldwide feed ingredient prices have been declining through much of the 1980s, depressing prices of dehydrated alfalfa products and causing declines in U.S. pellet production, domestic usage and exports.

The Republic of Korea imposes a wide range of restrictive trade measures on agricultural and food products. Traditionally, the government has kept most food and agricultural items on restricted lists. In order to satisfy strong farm lobby groups, it has controlled the quantities of major agricultural products through a licence arrangement that restricts imports to designated importers. Prior to 1987, import licences had not been issued for commercial shipments of dehydrated alfalfa products. The system is opening towards processed alfalfa imports, as government controls are slowly becoming less restrictive.

Non-tariff barriers, in the form of product standards, have hampered Canadian access to the large Japanese long-fibre market. Longer-fibre products such as dehydrated green chops or double-compressed, baled hay items are competitors for alfalfa cubes. In order to alleviate Japanese concerns about the possibility of inadvertently importing Hessian fly parasites from North America, the United States has signed an agreement with Japan to facilitate the entry of fumigated, baled hay into that market. Canada does not have a similar agreement with Japan, so comparable Canadian products cannot be shipped there without first receiving a rigorous visual examination conducted by Agriculture Canada inspectors. In early 1988, however, Japan did agree to a protocol to admit the entry of a dehydrated or artificially dried long-fibre product from Canada that would be packaged and shipped without the need for a visual inspection, provided that certain very specific plant operating conditions were met. Some further liberalization of these restrictions is necessary to bring about increased trade for this particular type of product.

Under the FTA, Canada also agreed to eliminate WGTA subsidies on products shipped to the United States through western Canadian ports. However, in-transit shipments to third-country markets through U.S. ports would not be affected. At the present time, the operation of the WGTA is under study as part of the Agriculture Policy Review launched by Agriculture Canada.

Technological Factors

Most of the production technology in Canadian plants has been developed abroad. Minor technology improvements are generally incorporated into processing plants as they are renovated to improve efficiency. Since the industry is a major energy user, it has undertaken some research on alternative fuels and energy conservation.

The nutritional aspects of alfalfa products and optimal feeding practices have been the focus of research at universities and Agriculture Canada research stations in Western Canada. These efforts have included test-feeding livestock on dehydrated whole-plant cereal products and on long-fibre alfalfa products in an attempt to diversify industry product lines.

The industry has also benefited from the development of winter-hardy and high-yield alfalfa varieties as well as improved field management practices. Most recently, research

has focused on methods to combat the Hessian fly and the plant species that host this insect. Resolving Japanese concerns about the possible entry of this parasite into Japan is a precondition to opening markets for a wider range of Canadian fibre products exports.

The high transportation cost of moving bulky fibre products over long distances to export markets is a fundamental constraint facing the industry. Attempts to improve penetration of foreign fibre product markets have focused on the development of reliable production equipment (to manufacture a more densely packed product), better packaging systems and a low-cost automated production line.

As a research initiative, the industry is interested in improving the quality of alfalfa cubes as a means of improving international competitiveness. This would involve the production of experimental cubes of various colours and hardness characteristics in an attempt to produce a cube that more closely resembles the product the international market requires. Sophisticated laboratory instrumentation and computer vision techniques could be used to precisely quantify colour and density characteristics during the experimental process.

Evolving Environment

The industry will likely continue to rely heavily on export markets. Its objective will be to expand the already extensive network of export contacts and to obtain an improved, overall picture of market size and new market opportunities.

Alfalfa dehydrators are likely to continue to face the uncertainties associated with a heavy reliance on Japan as well as the pressure of competing feedstuffs in both domestic and export markets. Developing Pacific Rim nations represent a large potential market because of sizable livestock populations and limited amounts of arable land. Other sources of competition for these markets could come from Australia and China in the future.

Improvements in existing products and the development and testing of new products in which Canadian processors have a competitive advantage remain an important strategy for future industry performance. With competitive energy prices, the longer-term potential is likely to favour products adapted to artificial drying. The Canadian climate does not seem to be as conducive to producing the high-quality, sun-cured products on as consistent a basis as is possible in Australia or California. Products that are adapted to total or partial artificial drying include pellets, minicubes and possibly cubes as well as dehydrated green chops and other longer-fibre products.

Competitiveness Assessment

Canada is a major producer of cereal-based and oilseed-based feedstuffs, in addition to forages. Consequently, the processed forage industry will continue to face limitations in its domestic market because of competition from these other products.

The western industry has developed to serve the export market. It should remain competitive in that market because of its relatively inexpensive supplies of natural gas and usually abundant raw materials for processing.

Distance and transportation costs associated with moving bulky products whose sales are sensitive to freight rates limit participation in some offshore markets. Climatic considerations, problems associated with container use and availability as well as agricultural and trade policies, both domestic and foreign, also pose limits on industry growth.

Both Canada and the United States have natural competitive advantages in forage-based products and both will probably remain major exporters to offshore markets, with some limited two-way trade between them on a regional basis.

For further information concerning the subject matter contained in this profile, contact

Food Products Branch
Industry, Science and Technology Canada
Attention: Processed Forage
235 Queen Street
OTTAWA, Ontario
K1A 0H5
Tel.: (613) 954-2942
Fax: (613) 954-3107

PRINCIPAL STATISTICS

Crop year[a]	1973–74	1983–84	1984–85	1985–86	1986–87	1987–88	1988–89	1989–90
Establishments[b]	23	29	35	35	35	35	37	38
Employment[b]	N/A	655	655	725	725	750	800	825
Shipments[b] ($ millions)	8.5	64.5	66.6	57.9	66.9	62.3	87.0	103.5
Volume of pellets[c] (thousands of tonnes)	125	335	381	325	347	398	435	447
Volume of cubes[c] (thousands of tonnes)	N/A	57	65	85	106	121	169	238

[a]The production year for the processed forage industry is from 1 June to 31 May.

[b]ISTC estimates. This profile as well as those dealing with *Livestock and Poultry Feeds* and *Pet Foods* relate to the feed industry, SIC 1053 (see *Standard Industrial Classification, 1980,* Statistics Canada Catalogue No. 12-501). Establishments, employment and shipments data for SIC 1053 are shown in the profile on *Livestock and Poultry Feeds*. Like data in the other profiles relate to specific products and activities forming part of SIC 1053; such data are therefore not additive.

[c]Production volumes are estimated by Alberta Agriculture.

N/A: not available

TRADE STATISTICS

Crop year	1973–74	1983–84	1984–85	1985–86	1986–87	1987–88	1988–89[b]	1989–90[b]
Exports[a] ($ millions)	6.0	52.5	47.6	46.9	56.9	44.6	77.0	94.0
Domestic shipments ($ millions)	2.5	12.0	19.0	11.0	10.0	17.7	10.0	9.5
Exports (% of shipments)	70.6	81.4	71.5	81.0	85.1	71.6	88.5	90.8

[a]See *Exports by Commodity*, Statistics Canada Catalogue No. 65-004, monthly.

[b]It is important to note that the data in 1988 and after are based on the Harmonized Commodity Description and Coding System (HS). Prior to 1988, the shipments, exports and imports data were classified using the Industrial Commodity Classification (ICC), the Export Commodity Classification (XCC) and the Canadian International Trade Classification (CITC), respectively. Although the data are shown as a continuous historical series, users are reminded that HS and previous classifications are not fully compatible. Therefore, changes in the levels for 1988 and after reflect not only changes in export and import trends, but also changes in the classification systems. It is impossible to assess with any degree of precision the respective contribution of each of these two factors to the total reported changes in these levels.

DESTINATIONS OF EXPORTS[a] (% of total value)

Crop year	1983–84	1984–85	1985–86	1986–87	1987–88	1988–89	1989–90
United States	2	2	4	4	5	11	8
European Community	2	–	–	9	8	9	10
Asia	95	97	96	87	86	76	68
Other	1	1	–	–	1	4	14

[a]See *Exports by Commodity*, Statistics Canada Catalogue No. 65-004, monthly.

REGIONAL DISTRIBUTION[a] (average over the period 1986 to 1988)

	Atlantic	Quebec	Ontario	Prairies	British Columbia
Establishments (% of total)	–	3	21	73	3
Employment (% of total)	–	1	9	89	1
Shipments (% of total)	–	1	6	92	1

[a]ISTC estimates.

MAJOR FIRMS

Name	Country of ownership	Location of major plants
Falher Alfalfa Ltd.	Canada	Falher, Alberta
Parkland Alfalfa Products Ltd.	Canada	Zenon Park, Saskatchewan
Tirol Dehydrators Ltd.	Canada	Tilley, Alberta
Tisdale Alfalfa Dehy Ltd.	Canada	Tisdale, Saskatchewan

INDUSTRY ASSOCIATION

Canadian Dehydrators Association
Suite 201, 10358 - 105th Avenue
EDMONTON, Alberta
T5H 0K5
Tel.: (403) 425-5990
Fax: (403) 425-5996

Printed on paper containing recycled fibres.