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CANADIAN PULSE AND SPECIAL CROPS INDUSTRY: SITUATION AND OUTLOOK

Canadian pulse and special crops production more than tripled since 1991-1992 as producers adapted to low cereal grain prices by diversifying into alternative crops. The increased production resulted in an expansion of the pulse and special crops handling, marketing and processing industry. This generated increased employment and secondary benefits, especially for the rural areas of Canada, where most of the expansion took place. This issue of the *Bi-weekly Bulletin* examines the situation and outlook for the Canadian pulse and special crops industry.

PRODUCTION

Types of Pulse and Special Crops Produced

Canadian pulse and special crop production is very diversified with more than twenty crops produced. The term *pulse crops* refers to dry peas, lentils, dry beans, and chick peas. Fababeans are also classified as a pulse crop, but due to insufficient official production statistics, they are not included in the current discussion. The other special crops discussed in this article are: mustard seed, canary seed, sunflower seed, and buckwheat. In 2001-2002, the 8 major crops accounted for about 95% of the production, with dry peas accounting for nearly 60%. Other crops produced, but not discussed here, include: spelt, millet, kamut, quinoa, lupins, caraway seed, coriander seed, borage seed, safflower seed, hemp, dill seed, spearmint, fenugreek, anise, and ginseng. Canadian pulse and special crop production is concentrated in Alberta, Saskatchewan, Manitoba, Ontario, and Quebec. Production of dry peas, lentils, chick peas, mustard seed, and canary seed is concentrated in Saskatchewan, whereas production of sunflower seed and buckwheat is concentrated in Manitoba. Dry bean production is largely located in

CANADA: MAJOR PULSE AND SPECIAL CROPS PRODUCTION AND EXPORTS

	Dry Peas	Lentils	Dry Beans	Chick Peas	Mustard Seed	Canary Seed	Sunflower Seed	Buckwheat	**Total**	Value of Exports
	.....thousand tonnes.....									M$
1991-1992	410	343	136	0	121	100	134	23	**1,267**	317
1992-1993	505	349	74	0	133	124	65	11	**1,261**	346
1993-1994	970	349	131	0	216	128	79	8	**1,881**	473
1994-1995	1,441	450	171	0	319	240	117	12	**2,750**	661
1995-1996	1,455	432	203	1	244	155	66	21	**2,577**	781
1996-1997	1,169	403	133	4	231	285	55	22	**2,302**	690
1997-1998	1,747	379	164	15	243	115	65	17	**2,745**	782
1998-1999	2,337	480	189	53	239	235	112	15	**3,660**	955
1999-2000	2,252	724	294	197	306	166	122	13	**4,074**	1,011
2000-2001	2,864	914	268	388	202	171	119	14	**4,940**	1,153
2001-2002	2,196	585	255	465	89	92	98	14	**3,794**	1,050f
2002-2003f	3,080	770	345	590	225	210	120	15	**5,355**	1,200f

f: forecast, AAFC, January 2002; M=million
Source: Statistics Canada

Canada

Manitoba, Ontario and Alberta.

Within the major crop categories, there are several types produced, including the following: **dry peas** - yellow, green, small yellow, maple, marrowfat; **lentils** - large green, medium green, small green, red, dark green speckled, brown; **dry beans** - white pea, pinto, black, dark red kidney, light red kidney, white kidney, cranberry, small red, Great Northern, pink, brown, azuki; **chick peas** - large kabuli, small kabuli, desi; **mustard seed** - yellow, oriental, brown; **sunflower seed** - confectionary, oilseed; **canary seed/Canario**. Canario is a glabrous or hairless type of canary seed developed in Canada.

Growth in Pulse and Special Crops Production

Canadian production of the eight major pulse and special crops increased by 290% from 1.27 Mt (million tonnes) in 1991-1992 to a high of 4.94 Mt in 2000-2001. The increase was steady, although there was some decrease in 1995-1996 and 1996-1997, when area shifted to grain because the price of grain was relatively high. During the 1991-1992 to 2000-2001 period, wheat production decreased by 16%, coarse grain production increased by 12%, and oilseeds production increased by 66%. Pulse and special crops share of the total Canadian grains, oilseeds, and pulse and special crops production increased from 2% in 1991-1992 to 7.5% in 2000-2001. Dry peas accounted for most of the growth in production, increasing by 600% between 1991-1992 and 2000-2001, while lentil production increased by 165%. Dry bean production increased by nearly 100% during the same period. Canadian chick pea production started in the mid-1990s, with the first significant production of about 1,000 tonnes (t) in 1995-1996. Since then it has increased steadily to 465,000 t in 2001-2002. Mustard seed, canary seed, sunflower seed and buckwheat production have been variable since 1991-1992. For 2001-2002, pulse and special crops production decreased by 23% to 3.79 Mt because of drought in the major growing areas. Production of wheat, coarse grains and oilseeds also decreased.

Agronomic Limitations and Benefits of Pulse and Special Crops Production

Production of the various crops is limited by climatic and soil conditions. Crops such as dry beans and chick peas require longer frost free periods and more heat than crops such as dry peas and buckwheat. Crops such as lentils and chick peas do not tolerate excessive moisture. Therefore they are best suited to the brown and dark brown soil zones in Saskatchewan and Alberta. A further limitation for some crops is the limited availability of products for weed control. Pulse and special crops fit well in rotations with other crops. Their production increase has proven to be valuable in crop rotations which help to control weeds, diseases and insects, and improve soil texture and fertility. The pulse crops, when properly inoculated, are able to fix a large portion of their nitrogen requirements. The nitrogen fixed by pulse crops is also available for use by other crops the following year. Growing pulse crops in a rotation can result in yield increases for following crops. However, the nitrogen fixing ability of pulse crops varies, with fababeans and dry peas having the highest ability and dry beans the lowest.

MARKETING

At the world level, Canada is the dominant producer of canary seed and is the largest producer of dry peas. Canada became the largest producer of lentils in 2000-2001, but dropped to second place in 2001-2002. Canada is the world's largest exporter of dry peas, lentils, mustard seed and canary seed. In 2000-2001, Canada also became the largest exporter of chick peas. It also holds a significant share of the world's exports of dry beans and buckwheat.

Marketing Methods

In Canada, there are more than 90 companies buying pulse and special crops from producers, ranging from small family-owned businesses to large companies. Since many dealers have more than one location, the total number of plants receiving at least some pulse and special crops is in excess of 300.

The only futures contract available for pulse and special crops is the Field Pea Futures Contract at the Winnipeg Commodity Exchange (WCE). This is a feed pea contract, with pricing based on seven defined pricing regions across the Prairie provinces. However, the futures price is based on a Par region, central Saskatchewan, with delivery in alternate regions at predefined premiums and discounts reflective of the underlying cash feed pea market. The contract is traded in Canadian dollars and the trading months are March, May, July, October, and December. For further information visit the WCE website: **www.wce.mb.ca**

Production contracts are available before seeding which normally guarantee a price for part of the production. Deferred delivery or forward pricing contracts are available for most pulse and special crops, under which a producer can lock-in a price for future delivery. The remainder of the crops are sold at spot prices at the time of delivery. There are also some voluntary marketing pools.

CANADA: 2001-2002 PULSE AND SPECIAL CROPS PRODUCTION DISTRIBUTION BY PROVINCE

	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Quebec
	percent					
Dry Peas	*	25	67	8	*	*
Lentils	0	2	98	*	0	0
Dry Beans	0	22	1	51	20	6
Chick Peas	0	4	96	*	0	0
Mustard Seed	0	6	90	4	0	0
Canary Seed	0	2	86	12	0	0
Sunflower Seed	0	4	8	88	*	0
Buckwheat	0	*	1	73	21	5

* minor production

Source: Statistics Canada

A recent innovation in the marketing of pulse and special crops has been trading on the Internet where bid and ask prices, as well as delivery locations and time frames for delivery are posted. The buyer and seller then negotiate final conditions before the sale is completed.

Price Determination

An important factor in price determination to the producer is the cost of freight to the domestic or export markets, since the price paid to the producer depends on the price received by the dealer, less freight and handling charges. The majority of Canadian pulse and special crops are exported. Canadian prices are dependent on and the value of the Canadian dollar and world supply and demand. For feed peas, the price is also influenced by the prices of alternative sources of protein meal and feed grain. Regional supply and demand considerations also affect the price received by the producer.

Handling and Transportation

Pulse and special crops are delivered by the producer to the plant or the dealer sends a truck to pick them up at the farm. The plants are normally designed to handle one or more kinds of crops. In some cases, such as for feed peas, the grain elevators also accept deliveries. Deliveries are made throughout the year based on spot prices or conditions set under production or deferred delivery contracts.

Transportation from the dealer's plant to the customer is generally by truck, if the customer is in the same region. Railways are used extensively for shipments to customers in North America and for shipments to ports for overseas customers. Feed peas, sunflower seed and some food peas, lentils, chick peas, canary seed and mustard seed are shipped bulk in railcars, but the rest are mostly shipped in containers. The containers can be filled bulk or with seed packed in bags. The containers are trucked to the railway's closest container terminal. They are then transported by rail directly to the customer, if located in North America, or to container terminals located at ports, for overseas shipments. Containers can also be trucked to the appropriate port terminal for loading on ships. Some crops are shipped to ports in bags loaded in rail box cars or in trucks, bulk in hopper cars, or in intermodal domestic containers. They are then transloaded into ocean-going containers at the ports. Facilities have been developed at the port of Vancouver for the soft handling of bulk dry peas, lentils and chick peas. Canadian pulse and special crops are normally shipped through Canadian ports along the west coast, Vancouver and Prince Rupert, Thunder Bay, Montreal and other ports along the St. Lawrence Seaway, and through the northern port of Churchill on Hudson Bay.

Domestic Use

The largest domestic use of pulse and special crops is for livestock feed. About 90% of the domestic use of dry peas is for livestock feed, mainly in the Prairie provinces and mainly for feeding hogs. In addition, some low quality lentils, chick peas, fababeans and dry beans are also fed to livestock. Another significant use is for bird seed. Canary seed is the main crop used for this purpose, along with some sunflower seed, safflower seed, dry peas, buckwheat and millet. The food market consumes a small but significant portion of pulse crops, mustard seed, sunflower seed and buckwheat. An additional domestic use is as seed for planting.

Exports

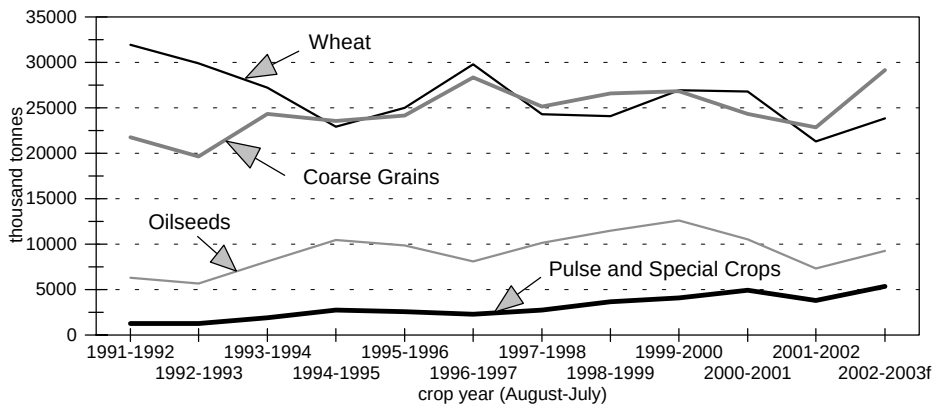
Canada exports pulse and special crops throughout the world. About half of the dry pea exports are for livestock feed and half for food. Canary seed is exported for bird seed. The remainder of the pulse and special crops are exported for food. Dry peas are exported mainly to Europe (largely for livestock feed) and to Asia (principally for food), although North and South America are also important destinations. Lentils are exported mainly to Europe, the Middle East, northern Africa, and North and South America. Dry beans are exported largely to Europe and North and South America. Most of the chick peas are exported to the Indian sub-continent, with the balance going to Europe, the Middle East, northern Africa and North and South America. Exports of mustard seed are primarily to Europe, Asia, and the U.S. Canary seed exports are largely to Europe and North and South America. Sunflower seeds are exported mainly to the U.S., with the balance going mainly to Europe, the Middle East and central America. Buckwheat is exported primarily to Japan, the U.S., and Europe. There are also exports of products processed from special crops, such as bird seed mixtures and roasted sunflower seeds, and special crops seed for planting.

Canadian export earnings from the eight major pulse and special crops increased by 265% during the period of 1991-1992 to 2000-2001.

PROCESSING

The Canadian pulse and special crops processing industry is very diversified and located throughout most parts of Canada. Primary processing involves receiving, cleaning and quality sorting of the product.

CANADA: GRAINS, OILSEEDS, AND PULSE AND SPECIAL CROPS PRODUCTION



f: forecast, January 2002
Source: Statistics Canada

Secondary processing involves preparing the product for use by the consumer and normally secondary processing occurs in a different plant from primary processing.

The largest secondary processor is the livestock feed industry, which consumes an increasing volume of dry peas, as well as some lentils and chick peas, mainly in the Prairie provinces. An innovative use of dry peas in livestock feed is a mixture of two-thirds ground peas and one-third canola meal. Although canola meal is an excellent source of protein, it is low in digestible energy. Peas have high energy digestibility, and the amino acid profile of peas, which is high in lysine, complements the amino acid profile of canola meal, which is high in methionine and cystine. These amino acids are essential in diets for good growth. A more recent development is an extruded blend of ground dry peas and canola seed. In addition to the two ingredients complementing each other, the high oil content from the canola seed is a readily available source of energy and can be used as a replacement for such products as corn oil or rendered fat.

The bird seed industry uses canary seed, as well as sunflower seed, safflower seed, millet, buckwheat and dry peas in feed mixtures for pet and wild birds.

Secondary processing includes the splitting of dry peas, lentils and chick peas; as well as canning, dry packaging, and the production of soup mixes, dehydrated products, gluten free flour, precooked and individually quick frozen products, soups, stews, and snack food. Dry peas and beans are also processed into components such as pea fibre, flour, starch and protein concentrate. Additional products of dry beans are refried beans and bean paste. Mustard seed is processed into flour and condiments. Confectionary sunflower seeds are used extensively for snack food, such as roasted seeds, and dehulled for use in baking. Buckwheat is milled into flour, groats and grits which are then used for baking, noodles, hot breakfast cereal or pancake mixes.

ECONOMIC IMPACT

Adaptation and diversification into pulse and special crops production has provided producers with a potentially higher priced alternative to traditional cereal grain crops and allowed them to spread risk over a greater number of crops to improve their earnings. Producers have become capable growers of special crops, allowing them to diversify even more when new markets arise. An additional benefit has been, via alternative crop rotation patterns, improvements in weed, insect and disease control and the resulting savings in input costs. Also, nitrogen fertilizer costs have been reduced in pulse crops production.

The increase in production has also benefited the general economy through the handling, processing, and transportation industries, mostly in rural communities. Direct employment by pulse and special crops dealers is estimated at about 2,500 employees. In addition, pulse and special crops contribute to employment in grain elevators, in transportation, transloading, port terminals, manufacturing of bags and other containers, in secondary processing, in manufacturing of inoculant for pulse crops, and with suppliers of seed for planting.

CANADA: 2000-2001 SHARE OF WORLD PULSE AND SPECIAL CROPS PRODUCTION AND EXPORTS

	Production	Exports
	.....percent.....	
Canary Seed	76	75
Mustard Seed	7	75
Lentils	29	65
Dry Peas	27	60
Chick Peas	6	35
Dry Beans	2	10
Buckwheat	1	5
Sunflower Seed	1	2

Source: AAFC estimate, February 2002

ORGANIZATIONS INVOLVED IN THE PULSE AND SPECIAL CROPS INDUSTRY

Research
A great deal of the credit for Canadian pulse and special crop expansion is due to industry supported research programs which developed varieties suitable for Canadian growing conditions, as well as improving weed, disease, and insect control. In addition to the production oriented research, there has also been work on the processing of pulse and special crops and the development of new products. The research programs are a partnership of the Government of Canada, Provincial Governments, University Faculties of Agriculture, dealers and processors, and producer organizations.

Canadian Special Crops Association
The Canadian Special Crops Association (CSCA) is an industry organization representing traders, exporters and processors of pulse and special crops. The CSCA website is: **www.specialcrops.mb.ca**

Pulse Canada
Pulse Canada is also an industry organization, with the CSCA and provincial pulse growers' organizations as members. It is involved in policy issues, coordinating research efforts and market development. The Pulse Canada website is: **www.pulsecanada.com**

Canadian International Grains Institute (CIGI)
CIGI has developed and implemented several training programs for domestic and international users of Canadian pulse crops.

Producer Organizations
Producer organizations include the following:

Alberta Pulse Growers Commission
www.pulse.ab.ca
Alberta Safflower Growers Association
Manitoba Buckwheat Growers Associations
Manitoba Pulse Growers Association

National Sunflower Association of Canada
Ontario Bean Producers Marketing Board
www.ontariobeans.on.ca
Ontario Coloured Bean Growers Association
www.ocbga.com
Saskatchewan Herb and Spice Association
Saskatchewan Mustard Growers Association
Saskatchewan Pulse Growers
www.saskpulse.com

These organizations support the industry in the areas of research, extension and market development. Most of them are financed by a producer levy. The remainder are funded by membership fees. All of these organizations operate under the direction of producer elected boards. The Ontario Bean Producers Marketing Board also administers a voluntary marketing pool for white pea beans produced in Ontario. The Alberta, Saskatchewan, and Manitoba Pulse Growers organizations, the National Sunflower Association of Canada and the Saskatchewan Mustard Growers Association also administer an advance payment program.

Universities
The faculties of Agriculture are responsible for educating Agrologists working with special crops and are involved in plant breeding, and agronomic and processing research.

Federal/Provincial Governments
Agriculture and Agri-Food Canada's involvement in the pulse and special crops industry include the creation of: enabling legislation regarding regulation and industry operations, production and processing research, quality control and inspection, price forecasting, market analysis, market development, initial price guarantees for some pooling programs, and cash advances under the Agricultural Marketing Programs Act (AMPA).

Provincial governments provide production and processing research, educational and advisory programs on production, and market development.

Canadian Grain Commission (CGC)
The CGC is responsible for the maintenance of quality for the following Canadian pulse and special crops: dry peas, lentils, dry beans, chick peas, fababeans, mustard seed, sunflower seed, buckwheat and safflower seed. For canary seed, the CGC does not set grading standards, but analyses samples for dockage. The maintenance of quality ensures a dependable and safe food commodity for domestic consumption and for exports, and promotes stability and competitiveness for producers, the industry and customers.

The CGC also issues licenses for grain companies. Not all pulse and special crops dealers are licensed by the CGC. Those grain companies, which are licensed by the CGC, are required to provide security, in the form of a bond or letter of credit, to the CGC to cover 100% of their liabilities to producers in the case of financial failure. The CGC fixes the amount of security to be provided based on the liability of the grain company to producers. Producers are not charged directly to cover these costs, but it is reasonable to assume that the cost is passed on by the grain companies to producers. Western Canadian producers selling pulse and special crops which are covered under the Canada Grain Act are eligible for compensation from the security if the grain company runs into financial problems. Pulse and special crops covered under the Canada Grain Act are: dry peas, lentils, dry beans, chick peas, fababeans, mustard seed, sunflower seed, buckwheat and safflower seed.

For further information on grain company licensing, or to access the Official Grain Grading Guide, please visit the CGC website: **www.grainscanada.gc.ca**

2002-2003 OUTLOOK

Canadian production of the eight major pulse and special crops is expected to increase in 2002-2003 due to an increase in seeded area and average yields which are expected to be higher than in 2001-2002. However, average yields for most crops are expected to be below the long term trend because of dry conditions in Saskatchewan and Alberta. The main factor to watch will be precipitation during the rest of the winter and, especially, during the spring and summer in Saskatchewan and Alberta. For further information please see the "Canada: Special Crops Outlook", which is available at **www.agr.gc.ca/mad-dam/**

LONGER TERM OUTLOOK

Production and Use
Canadian seeded area and production of pulse and special crops is expected to continue trending upwards during the next decade because of improved varieties resulting in higher yields, increased seeded area because of the willingness of producers to continue diversifying out of grains in the Prairie provinces, and increasing demand in Canadian and world markets. The level of the increase will depend on returns from pulse and special crops relative to grains and oilseeds, moisture conditions, carry-in stocks, crop rotation considerations and the producers' ability to diversify. Most of the growth is expected to be in Saskatchewan, due to its large land base and the continuing development of varieties suitable for production in that province. Most of the production growth is expected to result from increased seeded area, but average yields are also expected to continue trending upwards.

The future trends, compared to the 2002-2003 forecast, for specific crops in Canada are as follows:

Dry peas - Production is expected to increase significantly due to increased demand in both feed and food sectors, the development of improved varieties and their fit in rotations with other crops. Canada is expected to continue to be the largest producer and exporter of dry peas in the world. New export markets for feed peas are expected to be developed, especially in eastern Asia.

Lentils - Production is expected to trend upwards with increased world demand, a large area of land suitable for lentil production in the Prairie provinces, especially in Saskatchewan, and the development of improved varieties, as well as agronomic improvements. Canada is expected to be the largest producer of lentils in the world and to continue to

dominate exports.

Dry beans - Production is expected to keep growing in Canada, with most of the growth in Manitoba and Saskatchewan. Saskatchewan is expected to become one of the main dry bean producing provinces, as shorter season varieties become available. The growth is expected to be mainly for the coloured types. Canada's share of world exports is expected to increase, in line with the increased production.

Chick peas - Production is expected to increase but the growth in production will, to a large extent, depend on the development of shorter season and more disease resistant varieties, which will enable the crop to be grown over a larger area. Canada is expected to increase its share of world chick pea production and exports.

Mustard seed - Production is expected to increase slowly because the market is limited, but Canada is expected to continue as the major exporter.

Canary seed/Canario - Production is expected to increase slowly, unless other uses are developed which increase demand. Research is underway to develop markets for Canario as a human food and for industrial uses, such as cosmetics. If the research efforts are successful, the demand for canary seed will increase faster and lead to larger growth in production.

Sunflower seed - Production of confectionary seed is expected to grow moderately in line with the growth in demand. Oilseed sunflower production is also expected to grow, but the rate of growth will depend on the price for vegetable oil, as well as the growth in demand for bird seed. An additional factor is the growth in demand for NuSun, a mid-oleic sunflower, which has a low saturated fat profile. NuSun production has been expanding rapidly in the U.S. because of a strong demand for NuSun oil. A continuing strong increase in demand for NuSun oil and attractive prices would result in a faster increase in Canadian oilseed sunflower production and possibly a return to sunflower seed crushing in Canada.

Buckwheat - Production is expected to grow slowly until new higher yielding and more frost tolerant varieties are commercially available. This development is expected to encourage larger production. Research is underway to develop uses for buckwheat in the pharmaceutical and nutraceutical industries. This potential is expected to increase the demand for buckwheat.

Other - Production of smaller area special crops such as spices, herbs, spelt, kamut and quinoa is also expected to increase over the next decade. However, the market for these crops can be oversupplied very quickly. Therefore, they will be important crops to some producers, but the total seeded area is not expected to become large.

Processing

Primary and secondary processing of pulse and special crops is expected to continue to expand because of increasing supply. The rate of increase in secondary processing is expected to be higher than for primary processing as the primary processing industry is currently more developed than the secondary processing industry. Increased secondary processing is expected in all sectors, food, feed, bird seed and industrial. The secondary processing sector is expected to become more diversified, with a larger range of products produced. Increased secondary processing is expected to increase domestic consumption and increase exports of semi-processed and consumer ready products. In the primary processing sector, identity preservation and traceability for shipments is expected to increase in response to consumer demand.

Research

Research is expected to continue on developing better varieties, and disease, weed and insect control. Research on developing new products from pulse and special crops is also continuing. This includes research on feeding to livestock, the pharmaceutical and nutraceutical potential, and food and industrial uses. Researchers and industry representatives from Canada and several other countries are in the process of developing international standards for the identification and testing of pulse crops. Testing methods will be developed for such traits as colour, texture, taste, cooking time and splitting and milling ability. The CGC has developed a computerized colour assessment system for lentils. This system could be applied to other pulse crops in the future.

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