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CANADIAN PULSE AND SPECIAL CROPS INDUSTRY: SITUATION AND OUTLOOK

Canadian pulse and special crops production more than quadrupled since 1991-1992 as producers diversified into alternative crops to improve their income. 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, chickpeas and fababeans. Special crops include mustard seed, canary seed, sunflower seed, buckwheat, caraway seed, coriander seed, borage seed, safflower seed, millet and hemp.

This article concentrates on the four largest pulse crops, dry peas, lentils, dry beans and chickpeas, and the four largest special crops, mustard seed, canary seed, sunflower seed and buckwheat, produced in Canada. Canadian pulse and special crop production is concentrated in Alberta, Saskatchewan, Manitoba and Ontario. Production of dry peas, lentils, chickpeas, mustard seed, and canary seed is concentrated in Saskatchewan, whereas production of sunflower seed and buckwheat is concentrated in Manitoba. Dry bean production is mostly located in 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; **chickpeas** - large kabuli, small kabuli, desi; **mustard seed** - yellow, oriental, brown; **sunflower seed** - confectionery, oilseed; **canary seed/Canario**. Canario is a glabrous or hairless type of canary seed developed in Canada.

Growth in Pulse and Special Crops Seeded Area and Production

Canadian seeded area for the eight major pulse and special crops increased by 256% from 0.93 million hectares (Mha) in 1991-1992 to 3.31 Mha in 2004-2005. During this period, total pulse crops seeded area increased by 311% from 0.62 Mha to 2.54 Mha and total special crops seeded area increased by 146% from 0.31 Mha to 0.77 Mha.

Canadian production of the eight major pulse and special crops increased by 313% from 1.27 Mt (million tonnes) in 1991-1992 to 5.23 Mt in 2004-2005. Although production trended upwards, there were some years of lower production caused mainly by unfavourable weather. During the 1991-1992 to 2004-2005 period, wheat production decreased by 19%, coarse grains production increased by 21%, and oilseeds production increased by 79%. Pulse and special crops share of the total Canadian grains, oilseeds, and pulse and special crops production increased from 2% in 1991-1992 to 8% in 2004-2005. Dry peas accounted for most of the growth in production, increasing by 714% between 1991-1992 and 2004-2005, while lentil production increased by 180%.

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 chickpeas require longer frost free periods and more heat than crops such as dry peas and mustard seed. Crops such as dry beans need adequate moisture later in the summer than shorter season crops. Crops such as lentils and chickpeas 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. Pulse crops, when properly inoculated, are able to fix a large portion of their nitrogen requirements. The nitrogen fixed by pulse crops, which is not removed with the harvesting of the seed, 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 largest producer of canary seed and dry peas and the

largest exporter of dry peas, lentils, mustard seed and canary seed.

Marketing Methods

In Canada, there are approximately 100 dealers 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.

There are no futures contracts available for pulse and special crops in Canada. 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 is sold at spot prices at the time of delivery. There are also several voluntary marketing pools. A more recent innovation in the marketing of pulse and special crops has been trading on the Internet where bid and ask prices, 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 and export markets, since the price paid to the producer depends on the price received by the dealer, less freight and handling charges. Since the majority of Canadian pulse and special crops are exported, Canadian prices are dependent on 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 load the seed at the farm. The plants are normally designed to handle one or more kinds of crops. In some cases, such as for feed peas, 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 in the same region is generally by truck. 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, chickpeas, 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 ports.

Facilities have been developed at the port of Vancouver for the soft handling of bulk dry peas, lentils and chickpeas. 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, chickpeas, 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 chickpeas 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 US. Canary seed exports are largely to Europe and North and South America. Sunflower seeds are exported mainly to the US, with the balance going mainly to Europe, the Middle East and central America. Buckwheat is exported primarily to Japan, the US, and Europe. There are also exports of products processed from special crops, such as bird seed mixtures and roasted sunflower seeds, and pulse and special crops seed for planting.

Canadian export earnings from the eight major pulse and special crops increased rapidly from \$0.3 billion in 1991-1992 to a peak of \$1.15 billion in 2000-2001 and 2002-2003. Since then, the value of exports has stabilized at about \$1 billion per year.

Canadian Grain Commission (CGC)

The CGC establishes quality standards for the following Canadian pulse and special crops: dry peas, lentils, dry beans, chickpeas, fababeans, mustard seed, sunflower seed, buckwheat and safflower seed. Additionally, the CGC grades and certifies export shipments. For canary seed, the CGC does not set grading standards, but analyses samples for dockage.

The CGC also issues licenses for grain companies, although not all pulse and special crops dealers are licensed by the CGC. Grain companies licensed by the CGC are required to provide security, in the form of a bond or letter of credit, to the CGC to cover 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 eligible 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, up to the value of the bond.

Pulse and special crops covered under the Canada Grain Act are: dry peas, lentils, dry

beans, chickpeas, 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

PROCESSING

The Canadian pulse and special crops processing industry is very diversified and located throughout most regions of Canada. Primary processing involves receiving, cleaning and quality sorting of seed. Secondary processing involves preparing seed 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, chickpeas and fababeans, mainly in the Prairie provinces. One 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. Another feed product 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.

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 chickpeas; 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.

Confectionery 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 pulse and 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.

Farm cash receipts for pulse and special crops increased by 223% from 1991 to \$0.83 billion in 2003, while receipts fell by 7% to \$2.47 billion for wheat, increased by 27% to \$1.44 billion for coarse grains and increased by 129% to \$2.72 billion for oilseeds. However, the receipts for pulse and special crops are only for the seven largest crops and the total receipts would have been higher if all pulse and special crops were included.

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 inputs and inoculants for pulse crops, and with suppliers of seed for planting.

2005-2006 OUTLOOK

Canadian production of the eight major pulse and special crops is expected to decrease in 2005-2006 due to a decrease in seeded area and lower trend yields for most crops. For further information and periodic updates please check "Canada: Pulse and Special Crops Outlook" 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 moderately 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 US Farm Security and Rural Investment Act of 2002 (FSRIA) included dry peas, lentils and small chickpeas under the loan program for the first time. Since then, US production of dry peas and lentils increased sharply which increased competition for Canadian dry peas and lentils in world markets and pressured Canadian prices. If US production continues to increase, it will further increase competition for Canadian dry peas and lentils, and pressure Canadian prices. Lower Canadian prices would limit the expected upward trend in Canadian production.

The future trends for the ten years following 2005-2006 for specific crops in Canada are as follows:

Dry peas - Production is expected to trend upwards moderately 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 moderately 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 become the largest producer of lentils in the world and to continue to be the largest exporter.

Dry beans - Production is expected to trend upwards moderately, 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.

Chickpeas - Production is expected to trend upwards, but the growth in production will depend on the development of shorter season and more disease resistant varieties, which will enable the crop to be grown over a larger area and reduce production risk. Canada is expected to increase its share of world chickpea production and exports.

Mustard seed - Production is expected to increase slowly because the market is limited, but Canada is expected to continue to be the largest 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 confectionery 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 seed, which has a low saturated fat profile. NuSun production has been expanding 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, which is expected to increase the demand for buckwheat.

Other - Production of smaller area special crops such as spices, herbs, spelt, kamut, quinoa and hemp 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

The primary processing industry for pulse and special crops is expected to grow slowly due to the rapid expansion in the late 1990's and early 2000's. The primary processing sector is undergoing consolidation in Saskatchewan due to the rapid growth and lower crop production during 2001-2002 to 2003-2004 caused by unfavourable weather.

The secondary processing sector for pulse and special crops is expected to grow faster than the primary processing sector, as it is not as well developed as the primary sector. Increased secondary processing is expected in all areas, 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.

Identity preservation

In the production and primary processing sectors, identity preservation and traceability for shipments is expected to increase in response to consumer demand.

Research

Research is continuing to develop better varieties, and improve 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 are being developed for such traits as colour, texture, taste, cooking time and splitting and milling ability.

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