

Development and diversification

The economic impacts of irrigation in Alberta are substantial. Extensive areas of grassland in southern Alberta have been transformed into irrigated, highly productive farmland. In turn, this has led to the development of secondary agricultural industries.

It has been estimated that 13% of the regional gross domestic product, 19% of regional production, and 30% of regional employment opportunities in southern Alberta are directly or indirectly associated with irrigated agriculture. Almost one-third of the province's gross domestic product in processing industries is directly related to irrigation.

Irrigation brings more than water to southern Alberta. It brings people, employment and economic stability. Historically, the stable agricultural base created by irrigation has helped foster the growth of many small towns — and two large cities — which now support their own development. In the town of Raymond, for example, community irrigation projects established by Mormon pioneers at the turn of the last century made possible the growth of sugar beets and the development of a sugar refinery. The town continues to prosper through irrigated farming and ranching in the area, though the refinery has relocated to a newer, more central, and larger facility.

Statistics indicate the average population density of agricultural areas with little or no irrigation is about one quarter of that in rural locations where irrigation plays a significant role. Between 1961 and 1986, for example, population in one irrigated community of southern Alberta increased 39%. By contrast, population in a nearby town with very little irrigation decreased 18%.

Water itself is a major reason for this population growth. The irrigation infrastructure is the source of domestic and municipal water for about 50 rural communities, and hundreds of farmsteads. Without irrigation, water supplies for many southern Alberta communities would have to be trucked in.

At least 40 industries, employing more than 4,000 people, use water from southern Alberta's irrigation districts. For example, the irrigation district infrastructure provides more than \$100,000 worth of water to seismic and mining operations located on and near agricultural lands. This type of spin-off industry creates additional jobs in the rural service sector and in retail operations. In turn, medical, educational, cultural, recreational and social

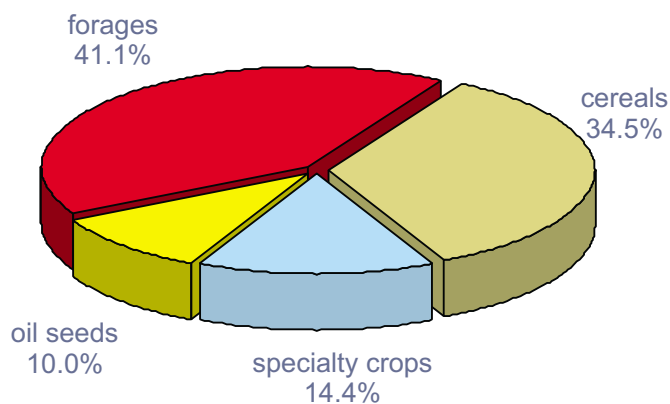
services are more abundant in irrigated areas, because of their greater stability.

In a more direct way, irrigation benefits farmers by both significantly increasing and stabilizing crop yields. The production of sugar beets, potatoes, pulses, soft spring wheat and other specialty crops would not even be possible without irrigation. Livestock production, which has made a significant contribution to the economy of southern Alberta, has been fostered by plentiful supplies of irrigated forage, silage made from irrigated crops, irrigated feed grains, and drinking water from irrigation systems.

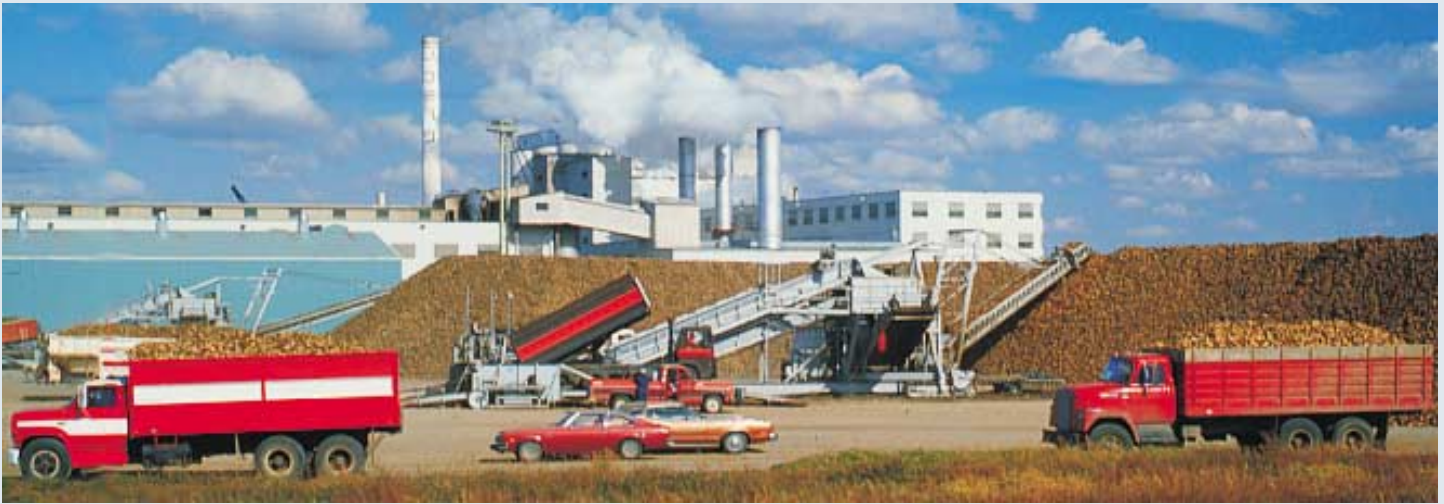
It should be noted, however, that irrigation is not an automatic link to farm profitability. The average irrigated farm has a greater investment in equipment and technology than a similar-size dryland farm and is thus more susceptible to decreases in market prices and inefficiencies in management. Land tends to be higher priced where irrigation is available and taxes may be higher. Increases in the price of fuel and energy affect irrigated farms more significantly, because of the greater use of powered equipment. Irrigation district members also pay from \$11 to \$40 per hectare per year for the water they use. Soil, topography, drainage, growing season, yield potential and markets are crucial elements in the decision-making as to whether an investment in irrigation will prove a profitable one.

Crop Diversification

Cereals and forages are the primary irrigated crops in Alberta. About 113,000 hectares of barley, 97,000 hectares of wheat and 90,000 hectares of alfalfa are grown on irrigated land. The production of specialty crops and



major crops grown on irrigated land in alberta



The sugar beet industry in Alberta owes its existence to irrigation. Almost 850,000 tonnes of sugar beets, grown on about 20,000 hectares of irrigated land, are processed into refined sugar each year. This helps reduce the import of cane sugar products to Canada and boosts the Alberta economy by \$30 million in sales annually. The Rogers Sugar processing plant in Taber, shown above, underwent

a \$35 million expansion at the end of the 1990s. Installation of a wastewater facility for the plant created more than 20,000 man-hours of employment alone. Plant expansion has led to an increase in permanent employment and major growth in the local economy through housing starts, retail development and the growth of service industries.

oilseeds is growing and continues to increase, especially in the Taber, Bow River, Eastern, Lethbridge Northern and St. Mary River Irrigation Districts. Irrigated crops grown include alfalfa, hard, soft and durum wheats, barley, oats, rye, field and table corn, canola, mustard, flax, potatoes, sugar beets, spices, beans, peas, lentils, carrots, wild bird seed, confectionary seeds and sod.

Irrigation not only offers the benefits of diversification to farmers, it creates opportunities in secondary manufacturing industries for society as a whole. Canola, for example, has become a major crop, processed primarily for its edible oil. Plant residues left after pressing are also made into a high-energy cattle feed. Many sawmills now use lubricants made from canola oil to grease their saw guides.

More than 3,000 hectares of beans, carrots, red beets, celery, cauliflower, berries and other fruit and vegetables grown on irrigated fields are canned or frozen in the province, at an approximate value of more than \$3.5 million. Several plants process timothy and other forage crops for export. Flour products and pasta are manufactured from irrigated wheat crops. Irrigated table corn has become an important source of income, both for farmers and vegetable processors. About \$1.5 million worth of irrigated corn is now canned or frozen in southern Alberta, and thousands of families enjoy the taste of freshly picked, sweet corn-on-the-cob from the Taber area each summer.

Growth has also taken place in the area's dried pea and bean fields. Bean production has grown from 275 hectares in 1973 to more than 24,000 hectares a year, with a farm-gate value of almost \$25 million. It has also given rise to major processing plants in the Bow Island and Taber region. About \$2 million worth of irrigated, fresh green peas are also processed in Alberta each year.

Virtually all Alberta beans are grown on irrigated land. As with other specialty crops, bean production gives Alberta farmers choices when prices in traditional commodity markets fall.

Livestock Industry

Irrigation has also led to tremendous growth in the province's livestock industry. As in other segments of agriculture, the decision on which crops to grow is being increasingly determined by the possibility of adding value to farm products through local processing. By feeding their relatively low-value grains and forages to livestock, farmers can convert them to higher-value meat products. Irrigated barley, in particular, has been a boon to the industry, as it offers a low cost, high protein, high energy feed that produces lean, tender meat.



Potatoes have been grown in Alberta since the first settlers brought them to their kitchen gardens, but with the advent of large scale irrigation systems, the crop has become the focus of a major primary and secondary agricultural processing industry. In the last decade in particular, production and processing have increased enormously.

Commercial potato production was established in Alberta in the 1930s. In 1937, growers produced about 14 tonnes per hectare of table potatoes on 2400 hectares of irrigated land. Current potato production on irrigated land is more than 14,000 hectares a year, and yields have more than doubled. Approximately 65% of the crop goes to processing plants in the Taber, Lethbridge and Calgary areas. These plants produce frozen, fried and dehydrated potato products for global distribution. Lamb-Weston, McCain, Frito-Lay, Old Dutch, and Maple Leaf are the major players in the potato processing industry, employing approximately 700 people.

Irrigation water is also a critical component of potato processing plant operations. Officials at Lamb-Weston, for example, said access to a regular supply of water was a key factor in their decision to locate their first Canadian factory near Taber. The operation is capable of processing almost half a million kilograms of frozen french fries daily.

A state-of-the-art, \$19 million water treatment facility at the plant supplies the facility with drinking quality

water and partially treats the nutrient-rich wastewater from the processing operations. Water for the project comes from Fincastle Lake, part of the Taber Irrigation District system, and is directed through a pipeline to a collection pond at the processing plant. The water is then pumped to the treatment centre, where it is purified for use as a transport medium to carry the potatoes through the plant and wash them. The used water is then sent through other pipelines to giant holding ponds. Eventually, the wastewater is used as a liquid fertilizer, applied to local area fields.

The Lamb-Weston plant is licensed to take about 2,400 cubic decametres of water from Fincastle Lake annually. About 90% of it is returned to irrigate and fertilize nearby agricultural land. The fields where the potato wastewater is used are extensively tested to make sure they are capable of handling the extra nutrients without damage to soils or to water quality. The company has been given a coveted Alberta Emerald Award for its innovative environmental practices in the design and operation of the plant.

The McCain Foods plant at Chin, east of Lethbridge, has a tertiary treatment system for recycling their processing water. The fully purified wastewater can irrigate approximately 260 hectares of cropland. The processing plant, which employs about 250 people, uses about 5,000 hectares of potato crop annually, all from irrigated fields in southern Alberta. It is estimated this plant alone contributes about \$245 million a year in direct and multiplier benefits to the provincial economy.



Sunflower seeds have become a major agricultural product in Alberta, thanks to irrigation and the entrepreneurial skill of Tom and Emmy Droog. The Droogs first began growing sunflowers in the early 1980s, packaging seed for bird feeders. They later ventured into producing and processing the seeds for human consumption, as a snack food. Under the Spitz brand, they sold 50,000 bags of sunflower seeds in their first year. The company now sorts, roasts, seasons and

packages 75,000 bags of confectionery seeds a day, at a multi-million dollar processing plant that employs more than 60 people.

The growth of the business has also given rise to a separate marketing division in Medicine Hat and a distribution network which alone employs 35 people. To obtain the sunflower seeds for this operation, the Droogs now contract with farmers in Alberta and Saskatchewan.

Alberta's irrigation systems have helped create Canada's largest beef cattle industry by assuring the supply of relatively inexpensive pasture, feed and water. Alberta's slaughter cattle industry has been in an expansionary phase since 1988, and now accounts for almost half of the province's total farm cash income, in excess of \$3 billion annually. About 40% of the country's beef herd is raised in Alberta.

Alberta has been known for beef since settlers first came to the region and found the native grasslands and the climate good for raising range cattle. In recent years, however, the beef cattle industry has evolved into two specialized sectors, cow-calf operations and intensive feedlot operations. Feedlots allow farmers and ranchers to sell their animals throughout the year, levelling off farm income and lowering the costs of getting the cattle to market. Approximately 300 Alberta feedlots now produce almost 2.5 million slaughter cattle a year, supplying fresh beef on a year-round basis.

About 60% of the province's feeder cattle are associated with irrigated farms. In the Lethbridge area alone, more than 1.5 million beef cattle a year — about 75% of the province's total — are fed for slaughter. Estimates are that

without irrigation, Alberta could lose almost one million feeder cattle sales a year to the United States.

Substantial growth has also occurred in the pork, poultry and specialty meat industries in irrigated areas. Alberta now raises and processes almost two million pigs, about half of them for sales outside the province. Bison, goats, sheep, ostriches and other livestock are fed irrigated crops or graze on irrigated pasture. About 65% of southern Alberta's dairy industry is also irrigation dependent.

Good quality livestock drinking water is crucial to a successful feedlot, ranch or dairy industry, and obtaining this water from irrigation systems is more reliable, more economical, and of higher quality than limited groundwater resources. It should also be noted that while a 10,000-head feedlot requires as much as 380,000 litres a day for the animals' drinking supplies, plus additional water for other purposes, this is still less than the water needed to irrigate 65 hectares of crop land.

However, the growth of the province's livestock industry — it's more than doubled in the last decade alone — has not been without challenges, particularly in regard to manure management. Though manure is an excellent soil conditioner and fertilizer, the expansion of the livestock



Most feedlots in southern Alberta rely on irrigation systems for an assured supply of good quality drinking water for their livestock.

industry has led to an overabundance in some regions, creating water and air quality concerns. The provincial and federal governments, in cooperation with private industry, through organizations like the Alberta Cattle Feeders Association and Alberta Pork Producers, are looking at ways of meeting these challenges.

To protect surface water quality, the industry has adopted new guidelines for land application or spreading of manure and for the proximity of livestock feeding locations to water sources. New manure lagoon designs minimize runoff and reduce odors. Research projects, conducted by government with support from the livestock industry, are exploring other ways of dealing with livestock manures. Composting can reduce the water content of the manure, to make it more economical to haul to distant fields. A method of fast-freezing feedlot effluents during the winter for use on fields later in the year shows promise, as do tests on alternative feeds that reduce the amount of manure an animal produces.

In a very direct way, irrigation also makes water available for aquaculture. Table-sized trout, tilapia and eels are being raised on about a dozen fish farms in the irrigation districts, using water from the canals for

specially constructed pools. In winter months, a half-million dollar commercial fishery on southern Alberta's irrigation reservoirs gives licensees, most of them farmers, a chance to supplement their incomes with whitefish.



Aquaculture, or fish farming, using water from the irrigation systems has become a profitable alternative livestock venture for many southern Alberta farmers.

Feeding a growing world

Though estimates of global population levels in the next decades vary — most experts expect the number of people in the world to double in the next 40 years — there is little doubt that more food will be needed to feed more people. Alberta's irrigated farm lands and thriving livestock industry is helping supply quality food to people, both at home and abroad, at reasonable prices.

Alberta's agricultural economy is export-oriented, with world-wide shipments of agri-food products now totalling about \$5.5 billion a year. An additional \$2.5 billion in agri-food products is shipped to other provinces. Wheat, meat, livestock, oilseed products, and barley are the province's chief food exports. Increasingly, however, other agricultural commodities are being grown for export. For

example, more than 80% of Alberta's half-million tonne bean and pea production is sold offshore. The United States and Japan are the major buyers of our agri-food products, but sales are truly global

Perhaps equally important as the export of food, is the export to developing countries of Alberta's scientific and technological expertise in irrigation. The gradual drying of the planet's agricultural lands threatens the livelihood of 900 million people. This global desertification also adds to soil erosion problems, further reducing the ability of people to feed themselves and sustain an agricultural economy. Well-planned and managed irrigation systems offer a partial solution.



A delegation from China on a tour of southern Alberta's irrigated areas.

Alberta's irrigation know-how is helping people around the world. For example, in 1998, irrigation experts from southern Alberta helped install state-of-the-art water control equipment in Uzbekistan, for the Syr Darya irrigation project. Scientists from Lethbridge also supplied local officials with needed research data and technological training. In addition to better managing the area's limited farm water supplies, the project helps control water levels in the environmentally-threatened Aral Sea ecosystem.

The Rajasthan Agricultural Drainage Research Project helped this Indian state install subsurface drainage (SSD) and associated water management techniques to control soil salinity and waterlogging on its irrigated agricultural

lands. The project area, about 385,000 hectares, serves a rural population of 500,000 people. About 90% of the area's limited rainfall comes during the monsoon season, from July to September. Reservoirs can now store monsoon rains for the many hot, dry months that follow. A plant was built to produce the required drain pipe and more than 14,000 hectares of SSD have been installed. Alberta expertise and experience was used to develop the scientific data and technology for the project, and to provide training for Indian scientists and labour.

Similar work is taking place in other monsoon areas of India and Pakistan, and in China and other Asian and African nations.