



Bi-weekly Bulletin

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PROTEIN MEAL: SITUATION AND OUTLOOK

The demand for protein meals is expected to increase significantly as the feeding of livestock continues to expand, especially in rapidly developing countries. The production of protein meals is also expected to increase sharply on support from the expanding renewable fuels sector in North America and Europe and the rising oilseed crush in South America and Asia. Canadian production of protein meals is projected to expand sharply over the medium-term due to an increase in canola crush and ethanol production. For 2007-2008, Canada is expected to export \$260 million of canola meal while importing \$300 million of soymeal. This issue of the *Bi-weekly Bulletin* examines the situation and outlook for plant-based protein meals.

OVERVIEW

Protein meal can be defined as a co-product derived from the crushing of oilseeds or the production of ethanol from a cereal. In North America, the most common protein meals are soymeal, canola meal and, more recently, dried distillers' grains with solubles (DDGS). Supply and demand conditions in one market affect the other (see *Bi-Weekly Bulletins* Volume 20, Number 7, *Vegetable Oils: Situation and Outlook* and Volume 19, Number 18, *Ethanol*). Historically these products served as substitutable sources of protein in livestock rations. With the expansion of renewable fuels production, DDGS can also be an economic source of dietary energy for livestock.

World Economic Growth Supporting Protein Meal Market

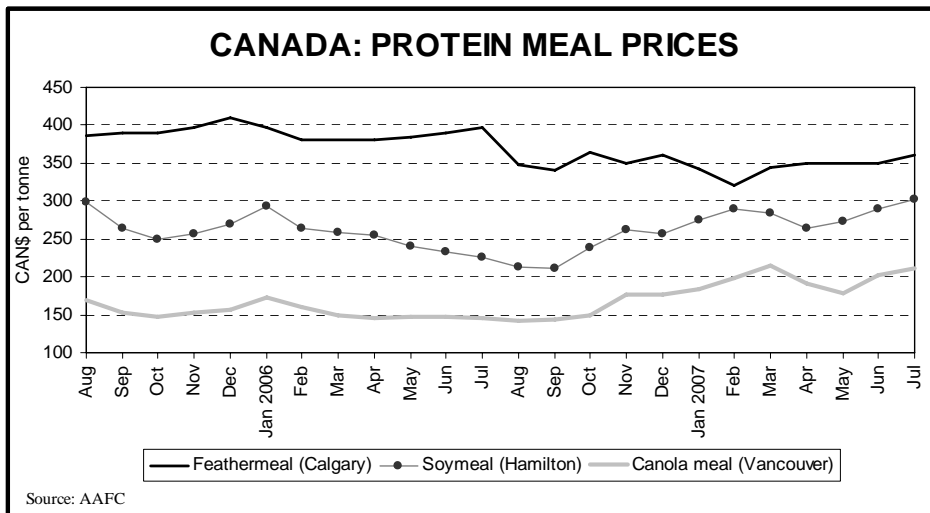
Since 2000-2001, world production of protein meals has increased by 29% compared to 26% for oilseeds, 38% for wheat and 23% for coarse grains. The growth in the world protein meal market was largely due to the expansion of soybean crushing in China, the United States (US) and Argentina to serve the phenomenal growth in consumption in China and a more modest growth in Brazil, India, and other countries.

The growth in the protein meal market has been driven by the rapid world-wide rise in per-capita disposable incomes and the urbanization in China and other developing countries. The world economy has expanded by over 4% annually since 2002. The demand for

meat and other livestock products, along with the derived demand for feed grains and protein meals, is projected to continue to increase in China and India while the expansion of the crush sector in Argentina and Brazil is expected to support economic growth in those countries.

World protein meal usage is also expected to rise due to the expected increase in population, although the rate of population growth is expected to decline relatively over the next 10 years, to 1.1% annually. The world population is expected to reach 7.2 billion by 2015 according to the Food and Agricultural Organization (FAO).

Dietary changes, resulting from increased per-capita incomes and urbanization, is occurring in most developing countries. This is leading to an increased demand for meat, which in turn is driving demand growth for feed ingredients. Per-capita meat consumption in China alone is projected to increase by 16% to 66 kilograms by 2016. When combined with population growth which is nearly twice that of developed countries, developing countries are becoming the new drivers for the rising demand for protein meals.



SITUATION 2006-2007

For 2006-2007, the highlight of the world protein meal complex was the rapid expansion in DDGS production as the US increased corn use for ethanol by 14 million tonnes (Mt), to about 55 Mt. Each tonne of corn used for ethanol production produces about 0.3 tonnes of DDGS. US production of DDGS increased by 4.2 Mt, to about 16 Mt, which is about 40% of US protein meal production, ex-DDGS.

For 2006-2007, world protein meal production, ex-DDGS, increased by 5% with the growth dispersed among the major oilseed crushing countries. Soymeal production increased by about 8 Mt, with the US as the world's largest producer at 38 Mt. World protein meal consumption increased by 5%, to 225 Mt. The European Union (EU), China and the US were the world's largest users of protein meal, at 52 Mt, 47 Mt and 35 Mt, respectively. World trade in protein meals increased by 3 Mt with Argentina and Brazil the dominant exporters. The EU-27 was by far the

world's largest importer of protein meals at 28 Mt. Carry-out stocks tightened marginally reflecting the strong world demand.

OUTLOOK 2007-2008

For 2007-2008, world protein meal production is forecast to rise by 4% from 2006-2007 as an expected increase in oilseed processing in China, Argentina and Brazil and, to a lesser degree, the US.

World production of soymeal, and canola/rapeseed meal is expected to increase by 7 Mt, and 1 Mt, respectively from 2006-2007, while the output of the other major protein meals is forecast to be largely unchanged. North American production of dried distillers' grains is projected at 27 Mt, about 12% of world vegetable protein meal output.

By type, the percentage distribution of protein meal is forecast at 69% for soymeal, 12% for canola/rapeseed meal, 7% for cottonseed meal, 5% for sunmeal, 2% for fishmeal, 2% for peanut meal, 2% for palm kernel meal and 1% for copra meal.

World consumption of soymeal is forecast to rise by about 6 Mt, while the consumption of canola/rape meal increases by 1 Mt. Consumption of the remaining protein meals is forecast to

WORLD: PROTEIN MEAL SUPPLY AND DISPOSITION

	2005 -2006	2006 -2007e	2007 -2008f
.....million tonnes.....			
PRODUCTION			
Soymeal	145.8	153.5	160.4
Canola/Rapemeal	26.2	27.1	28.4
Other	<u>43.5</u>	<u>45.5</u>	<u>45.9</u>
Total	215.5	226.1	234.7
TRADE			
Soymeal	51.3	53.2	56.1
Canola/Rapemeal	2.6	2.8	3.0
Other	<u>11.4</u>	<u>12.3</u>	<u>12.4</u>
Total	65.3	68.3	71.5
CONSUMPTION			
Soymeal	145.7	153.2	159.4
Canola/Rapemeal	26.2	27.2	28.3
Other	<u>43.1</u>	<u>44.4</u>	<u>44.8</u>
Total	215.0	224.8	232.5
CARRY-OUT STOCKS			
Soymeal	5.1	5.2	5.4
Canola/Rapemeal	0.6	0.4	0.4
Other	<u>1.2</u>	<u>1.1</u>	<u>1.2</u>
Total	6.9	6.7	7.0
OILSEED PRODUCTION			
Soybean	220.6	236.1	222.1
Canola/Rapeseed	48.7	46.2	51.1
Other	<u>121.7</u>	<u>122.7</u>	<u>122.5</u>
Total	391.0	405.0	395.7
OILSEED CRUSH			
Soybean	185.1	195.0	203.4
Canola/Rapeseed	44.3	45.4	47.9
Other	<u>88.2</u>	<u>91.0</u>	<u>91.6</u>
Total	318.1	331.4	342.9

Note: Other includes cottonseed, sunflower seed, fishmeal, peanut, copra and palm kernel

e: estimate; f: forecast, USDA-FAS

Source: USDA

CANADA: PROTEIN MEAL SUPPLY AND DISPOSITION

	2005 -2006	2006 -2007e	2007 -2008f
.....thousand tonnes.....			
CANOLA MEAL			
Carry-In Stocks	35	35	30
Production	2,025	2,165	2,305
Imports	<u>5</u>	<u>5</u>	<u>5</u>
Total Supply	2,065	2,205	2,340
Exports	1,489	1,525	1,665
Domestic Use	<u>541</u>	<u>650</u>	<u>645</u>
Total Use	2,030	2,175	2,310
Carry-Out Stocks	35	30	30
SOYMEAL			
Carry-In Stocks	12	9	20
Production	1,182	1,181	1,240
Imports	<u>1,302</u>	<u>1,330</u>	<u>1,350</u>
Total Supply	2,496	2,520	2,610
Exports	112	120	125
Domestic Use	<u>2,375</u>	<u>2,380</u>	<u>2,465</u>
Total Use	2,487	2,500	2,590
Carry-Out Stocks	9	20	20

e: estimate; f: forecast, AAFC

Source: Statistics Canada

DEMAND FOR DRIED DISTILLERS GRAINS

In the US, the Renewable Fuel Program of the Energy Policy Act of 2005 mandates a renewable fuel use in gasoline of 7.5 billion gallons (Ggal) by calendar year 2012. When combined with favourable prices, ethanol production is expected to exceed 12 Ggal by 2016, which is expected to consume 30% of the US corn crop. In turn, the production of the co-product, dried distillers grains with solubles (DDGS) is expected to rise to 32 Mt by the end of 2012. This rapid growth in DDGS supplies is creating concerns of an oversupply of protein meals.

Historically, DDGS were considered a supplementary source of protein in livestock rations and were priced competitively against soymeal, canola/rapemeal and other protein meals. Protein was considered an expensive ingredient in the ration and the minimum quantities were included in nutritionally-balanced, least-cost rations.

However, the expansion of the renewable fuels sector in North America is overturning standard feeding conventions and is making the starch component of a ration more expensive. The on-farm price for corn forecast at US\$3.10 per bushel (/bu) for 2007-2008, compared to only US\$2.00/bu for 2005-2006, which is a 55% rise in price. By contrast, the price of soymeal is expected to increase by only 23%, to US\$215 per short ton (/st) between 2005-2006 and 2007-2008.

As a result of the rapid increase in feed grain prices, cattle feeders are investigating the use of many non-traditional feed ingredients as a source of energy for livestock rations, including feeding more DDGS. DDGS can be fed as a source of energy in beef, and to a lesser extent, dairy rations, where the microbes in the rumen can digest a wide variety of feed materials. Consequently, DDGS can be a substitute for feed grains in ruminants. By contrast, due to the single stomach in poultry and hogs, DDGS can be fed as a source of protein and is substitutable with soymeal.

Currently, no clear, authoritative, consensus exists on how much DDGS can be included into nutritionally balanced livestock rations, by class. This remains an active research topic among livestock nutritionists. Including too much DDGS into the rations can create a range of undesirable side-effects for the various types of livestock including anti-nutritional impacts of too-much sulphur or adversely affecting meat quality through excessive and undesirable fat.

For 2007-2008, North American production of DDGS is estimated at about 27 Mt by the United States Department of Agriculture, based on forecasted ethanol production. Over the medium-term, more aggressive inclusion of DDGS in livestock rations is expected to reduce the surplus of DDGS, and reduce the cost of feed ingredients to livestock producers.

remain stable, except for DDGS which are expected to increase by about 9 Mt.

US protein meal output to rise

For 2007-2008, the production of protein meals is forecast to rise in the US. The output of soymeal is forecast to rise

slightly, to 38.9 Mt, resulting from a projected increase in the domestic crushing of soybeans. Domestic consumption of soymeal is expected to rise slightly, although new sources of demand appear limited with the livestock sector expected to be squeezed by higher feed grain costs. Exports of soymeal are expected to rise slightly but will be constrained by stiff competition from South American supplies and by active crush in China.

The production of canola/rape meal in the US is forecast to rise slightly due to the expansion of crushing facilities in North Dakota, expected to come on stream in 2008. The demand for the canola oil is expected to increase because of the various zero-trans fats mandates implemented across the US. Meanwhile, the production of distillers' grains is expected to rise sharply as the renewable energy sector continues to expand.

South American soymeal output increases

Soybean crush in **Brazil** is expected to continue its long-run expansion on support from increased domestic soybean supplies and a slight rise in world soymeal prices. However, this expansion will be limited by the appreciation of the Real against the US dollar. The production of soymeal is forecast to rise slightly to 23.7 Mt and exports are projected to rise marginally on support from strong European demand. Total domestic use is also projected to rise slightly on support from an expected rise in livestock feeding.

Argentina is expected to remain the world's largest exporter of soymeal for 2007-2008 due to increased investment in production-enhancement technology and an increased supply of soybeans. Soymeal production is forecast at 32.1 Mt, while exports are projected at 30.5 Mt of which about 17 Mt are for the EU. The supply of soybeans will be supported by the expected cultivation of pastures which are typically planted into

NORTH AMERICA: POTENTIAL DEMAND FOR DRIED DISTILLERS GRAINS WITH SOLUBLES

	Total Ration	Scenario 1 <i>conservative</i>	Scenario 2 <i>aggressive</i>
.....million tonnes.....			
Cattle	80	16.0	32.0
Hogs	31	1.6	6.0
Poultry	30	1.5	3.0
Dairy	<u>39</u>	<u>4.0</u>	<u>8.0</u>
Total	180	23.1	49.0

Scenario 1: DDGS replace 20% of the beef cattle, 5% of the hog and poultry and 10% of dairy grain rations on a dry matter basis.

Scenario 2: DDGS replace, 40% of the cattle, 20% of hog, 10% of poultry and 20% of dairy grain rations on a dry matter basis.

Source: AAFC based on USDA and Statistics Canada

central US into Ontario and the Prairies.

The production of canola meal is forecast to rise following the expansion of crush capacities across the Prairie Provinces. Two large-scale canola crushing plants are planned for the city of Yorkton, Saskatchewan, which is expected to make this location the center of price discovery for canola meal in Canada. Yorkton was chosen as the location for both plants because of its accessibility to large supplies of canola. In addition, the city has access to two rail lines which gives processors the option of shipping canola meal on the Canadian National or Canadian Pacific Railways. The resulting competitiveness in freight rates is expected to offset the higher purchase costs for canola as both plants compete for local supplies.

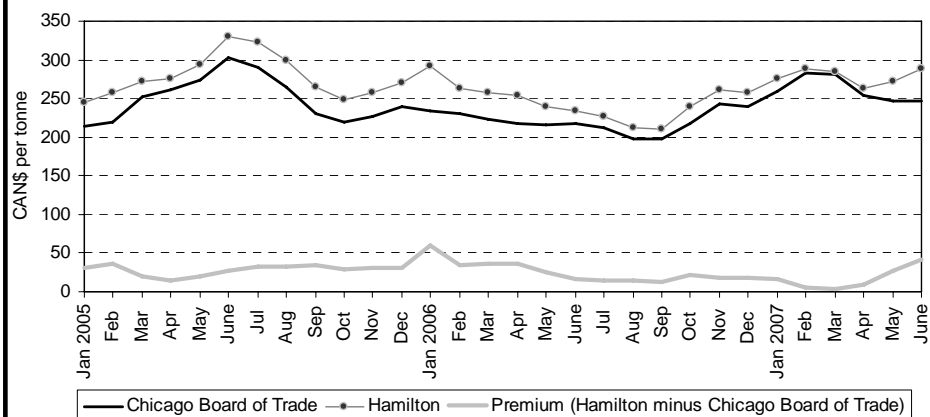
For 2007-2008, the production of soy meal in eastern Canada is expected to increase by 5%. The processing volumes at the two major crushing plants are expected to be constrained by the increased cost of importing soybeans into Canada, following the decline in soybean production in Ontario, and by the increased competition from other protein sources. Offsetting support will be provided by the higher soy oil prices.

Prices

The midpoint of the benchmark US price for soy meal, in-store Decatur, 48% protein, is projected to rise to US\$215/st {2,000 pounds (lb)} for 2007-2008, compared to US\$205/st expected for 2006-2007. This translates into an average price of about CAN\$265 per tonne (t) (2,204 lb) in-store Hamilton, based on an expected basis of CAN\$15/t and an exchange rate of US\$1=CAN\$1.05.

The spread between Chicago and Hamilton soy meal prices is expected to remain steady at about \$15/t for 2007-2008, as the expected increase in production is matched by a rise in US usage. The price of canola meal, in-store Vancouver, is forecast at about CAN\$175/t for 2007-2008, while the price of feather meal is expected to range around CAN\$350/t.

SOYMEAL PRICES



Source: Chicago Board of Trade, AAFC

soybeans for the first year. The expansion of soybean storage facilities will also provide currently under utilized crushing capacity with more supply later in the crop year.

Chinese production of soy meal is expected to rise, based on an expected 10% increase in soybean imports and stable domestic soybean production. For the first time in history, Brazil became the largest soybean supplier to China in 2005-2006 with a total volume of 11.7 Mt. Chinese industrialized feed production is projected to increase to about 131 Mt by 2010, versus 107 Mt for 2005 (the last year data was available). The impact of avian influenza on feed production is expected to be minimal for the near future.

European imports of protein meal are forecast to increase to 28.6 Mt for 2007-2008 due to an expected decline in domestic soybean supplies, strong feed demand and reduced supplies of competing corn gluten feed and meal. European farmers are expected to reduce the area planted to soybeans and switch into rapeseed and grains. For 2007-2008 livestock feed use is expected to increase marginally, due mainly to the continued expansion of the Polish livestock sector. Imports of corn gluten feed are expected to decline following the release of a genetically modified variety of corn in the US. This has resulted in small quantities of it being included in exported corn gluten feed. However, this variety has not been authorized in

the EU resulting in a zero tolerance for the meal.

Canada: net exporter of protein meal

For 2007-2008, Canada is expected to produce record quantities of protein meal as new processing plants under construction come on line, crush margins remain attractive and supplies of oilseeds continue to be adequate. Canada is expected to be a net exporter of protein meal, exporting canola meal mainly from western Canada into the intensive livestock regions in the western US, while importing soy meal mainly from the

CANADA: PROTEIN MEAL TRADE BY PROVINCE

	2005 -2006	2006 -2007e	2007 -2008f
.....thousand tonnes.....			
CANOLA MEAL: EXPORTS			
Alberta	558	675	700
Saskatchewan	364	300	415
Manitoba	286	350	350
Ontario	180	100	100
British Columbia	76	75	75
Quebec	25	25	25
Canada	1,489	1,525	1,665
SOYMEAL: IMPORTS			
Ontario	590	600	590
Manitoba	275	277	300
Alberta	200	200	200
British Columbia	102	100	100
Saskatchewan	50	75	75
Quebec	78	70	75
Maritimes	7	8	10
Canada	1,302	1,330	1,350

e: estimate, f: forecast, June 2007

Source: Statistics Canada

MEDIUM-TERM OUTLOOK

World production of protein meals (ex-DDGS) is projected to grow at 2.4% yearly until 2015, with a faster rate of growth for developing economies and a slower pace of growth for heavily industrialized countries. The growth in protein meal production and trade is directly linked to the optimistic economic outlook which is creating new demand for protein meals through increased consumption of livestock products in many developing economies. Similarly, the emergence of the renewable fuels sector is encouraging investment in oilseed crushing where protein meals are often considered a secondary by-product.

Most of the growth in the demand and supply of protein meals is occurring outside of North America and the EU, decreasing the relative importance of these regions in the world protein meal complex. The emergence of the renewable fuel industry in the US is expected to pressure soybean area for the foreseeable future as farmers switch to more profitable corn.

Farmers in South America are expected to take advantage of higher prices to expand soybean area which will provide the input for the oilseed processors. The urbanization of China is expected to continue for the foreseeable future, forming the base for solid growth in protein meal demand.

The growth in both production and consumption will trigger increased trade in protein meals which is expected to grow at a faster rate than trade in soybeans, wheat or corn. Most of this increased trade will be captured by South America, although the US will remain a major exporter of soymeal. The three countries of Argentina, the US and Brazil are expected to account for about 80% of the world exports of protein meal over the medium-term.

Canada

Canadian production of protein meals is projected to expand sharply over the medium-term due to the expansion of the canola crush sector to support the expected increase in food use of canola oil and to supply the expanding bio-diesel sector. Canola crush capacity is expected to reach 7.0 Mt, by about 2010, resulting in the ability to produce up to 4.2 Mt of canola meal. Assuming a stable domestic consumption, this will result in a potential expansion of canola meal exports to 3.5 Mt, more than double current levels. Research currently underway is seeking to expand the use of canola meal in livestock rations by using it as an energy source and by improving the quality of the amino acids to a level similar to soymeal.

Unlike the canola sector, soybean crushing is expected to remain stable over the medium-term. Consequently, Canadian production of soymeal is expected to remain stable at about 1.3 Mt, with additional imports forecast at about 1.0 Mt to make up domestic shortfalls for livestock feeding.

The production of dried distiller grains is expected to increase significantly, with wheat as the major feedstock in western Canada and corn in eastern Canada. A ready market for wheat-based DDGS is expected for western Canada, but the larger volumes and variable quality of corn-based distiller grains is expected to be more difficult to market. Exports of DDGS are expected to increase, most likely to off-shore markets given the burdensome supplies in the US.

Prices to remain low

The price of protein meal over the medium-term is expected to be within a fairly narrow range and will average about US\$25/t below the 5 year average price of US\$197/t during the first half of the 2000s. Prices will be pressured by expected massive production of DDGS, canola meal and soymeal as the renewable fuel sector continues to expand.

Over the medium-term, the factors to watch in the protein meal market include: the expansion of the renewable fuels sector in North and South America and the EU, the expansion of the crushing sector in South America and China, volatility in exchange rates and economic expansion in developing nations.

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