



The Bio-Products Industry

A SAC Inc. State of the Industry Fact Sheet

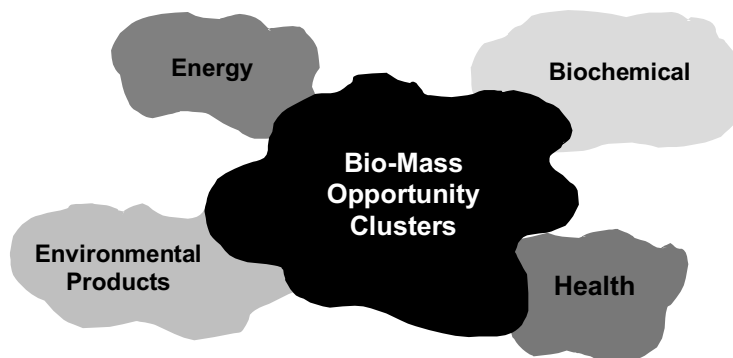
A Vision of Growth

Saskatchewan will revitalize its agricultural industry by continuing to strategically shift a portion of its agricultural resources from food production over to bio-based products targeted to industrial applications. By 2010, Saskatchewan's output of agricultural bio-based products will make up at least 25% of the farm gate revenues and 25% of the processing sector's value added. The growing demand for renewable biological materials for use in the industrial market is significant and global.

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The concept and terminology “bio-products” is being applied to describe this industrial, non-food and fibre marketplace. Bio-products are pharmaceuticals, fine chemicals, fuels, building materials and industrial feedstocks produced from renewable and sustainable biomass sources. They are more environmentally benign than their petroleum-based counterparts and are usually biodegradable.

Agricultural resources devoted to new industrial uses can be organized within four major biomass opportunity clusters: health, energy, biochemical and environmental products.¹ The agricultural bio-based marketplace in the world will reach 50% of agricultural value added processing by 2010.² According to BioProducts Canada Inc., bio-products and renewable biomass resources are expected to account for \$100 billion of Canada's GDP by 2020.³ The growth in this sector will be supported by the United States, which plans to triple its use of bio-energy and bio-based products over the next ten years.



Strategies and Action Plans

Significant opportunities exist for the Saskatchewan agricultural industry to develop more bio-based products for industrial applications. A study prepared in Saskatchewan analyzing 24 opportunities in the industrial market application for agricultural products found that \$1.5 billion in annual revenues and over 4,000 jobs would be created in the province if these opportunities were pursued.⁴ The recommended strategies include:

Saskatchewan Agrivision Corporation Inc. (SAC Inc.) is a coalition of farm, rural and business leaders working as a catalyst to proactively develop a vision for increased agri-value processing leading to increased farm gate income and rural revitalization.

1. Support the establishment of BioProducts Saskatchewan Inc., an industry led organization with a vision to position Saskatchewan as the leading Canadian province in bio-industry development. Government and the private sector will play an important role in providing start-up capital, policy and program development, technology transfer, and infrastructure support.
2. Identify market opportunities for Saskatchewan based bio-products and establish growth targets and measurements for the bio-based sector. It will be critical to communicate with other industries during this process (i.e. energy, health, chemical, forestry) and enhance the analysis of the economics and feasibility of bio-product manufacturing initiatives.
3. Utilizing identify-preserved and quality control systems.
4. Showcase the success of companies in Saskatchewan that are devoting their business to the bio-products sector.

Saskatchewan requires an environment for the development of new ideas, new research facilities, new products and new processing plants that will lead to value added industries in the province. To be a player in this growth market, Saskatchewan must strengthen its market skills, process development and engineering, specific research and technology development, quality measurements, and the many forms of economics and business analysis. Growth in this market will come from local entrepreneurs (“growth from within”) as well as strategic alliances with the larger national and multi-national corporations.

Global Trends

The utilization of agricultural commodities and inputs for bio-products is very diversified. The following lists a number of such uses:

- **Health** – pharmaceuticals, cosmetics, personal care, flavours and fragrances.
- **Energy** – bio-diesel, ethanol, fuel additives, biomass combustion, two cycle oils, transmission fluids and lubricants.
- **Biochemical** – coatings, film degradable polymers, plastics, dyes, paints, pigments, gums, adhesives, agro-chemicals, soaps, detergents, specialized industrial organics, fine chemicals, biological control products, cleaning agents, solvents, surfactants, ink.
- **Environmental Products** – paper and board, bio-composites, molded fibre, non-woven fabric, textile fibres, filler and insulation.

Examples of end-use markets derived from bio-products include: construction and building materials, household and personal items, paints, human and animal health care products, furniture, fuels and oils, automotive supplies, cleaners, shipping and packaging materials (including biodegradable), non-woven and composites, landscaping supplies, compost/fertilizers, natural plant protection products, soil remediation, and health products.

Food currently represents about three-quarters of the agricultural processing sector in the world. **Forecasters predict that non-food areas could reach 50 percent of agricultural value-added processing by 2010.** Key factors driving the introduction of agriculturally-based inputs into the bio- industrial market include: improved performance of manufactured products, sustainability of the inputs, the “low cost of use” (including the cost of raw materials, processing and waste disposal), technological advancements, political and society support, the green movement, and global climate change. Global production of crop derived materials for industrial use (vegetable oils, starch, and non-wood fibres) was estimated at 47 million tonnes in 2000 and is projected to grow to 73 million tonnes by 2010, a growth of 56%.⁵

It is believed the emerging “Life Science Revolution” will reshape the world’s agriculture and agri-food industry in the 21st Century. The boundaries between agriculture, industrial chemicals, energy, and health will converge developing what is envisioned as the largest industry in the world – the life science industry. The Government of Canada is forming strategies to transform agriculture and agri-food towards the life science economy with a focus on both food and non-food. Canada has a vision of being a world leader in the life science economy by 2010.

The Alternative Agricultural Research and Commercialization Corporation (AARC) in the United States has directly invested \$33 million in bio-product research and leveraged \$105 million of private funds over the past five years. In August 1999 the President of the United States proposed an additional \$242 million in 2001 for bio-based research and development and he called on the Secretary of Agriculture and the Secretary of Energy to develop a plan to triple the US production of bio-based products by 2010. The National Renewable Energy Laboratory (NREL) in Golden, Colorado receives \$175 million annually through the U.S. Department of Energy to fund renewable energy research. This organization estimates that the global market for “green” goods and services is worth \$400 billion annually.⁶ Canada will be a world leader in the life science economy because significant financial resources will be allocated in this direction and Saskatchewan will be a major beneficiary.

Saskatchewan has the largest renewable bio-product resources in Canada and significant research and technological support. In addition, Saskatchewan will have the world’s newest Synchrotron opening in 2003 that will place the province at the forefront of scientific research and development. With strong industry and government cooperation, Saskatchewan can become a major participant in capturing these growth opportunities.

Current Situation

The farm gate receipts of Saskatchewan’s agricultural production is \$6 billion while the value of the food processing industry shipments is \$1.8 billion for a total of \$7.8 billion. Saskatchewan accounts for only 2% of Canada’s agri-value added market and yet is the nation’s largest supplier of raw agricultural materials to national and international markets.

Examples of bio-products being developed in Saskatchewan include:

- agro-fibres
- specialty oils (including essential oils)
- therapeutics (including personal care, health care, animal care, nutraceuticals, pharmaceuticals)
- total crop fractionation
- renewable energies and bio-lubricants
- feeds
- agricultural co-product utilization (grain screenings, oil press cakes)

The current Canadian bio-industrial market is estimated at approximately \$50 billion compared to \$110 billion for the nation’s food and beverages sales. There are two important considerations relative to the industrial market opportunities for agricultural products. First, the rate of bio-product substitution for many industrial products over the next five years is projected to be very significant. Second, there is a great opportunity for increasing agriculture’s market share in this growth. Based on a target of 20 to 30 percent increase in sales and exports of agri-products to the bio-based market, there is a potential growth market of \$10 to \$15 billion. Saskatchewan is in the best position of any province in Canada to capture the majority of this market growth opportunity. Bio-products alone could double Saskatchewan’s farm gate returns and the value added sector by 2010.

There are a number of firms in Saskatchewan that have been formed over the past decade that address the agricultural bio-products sector. The following are examples of companies providing leadership in this area:

- **Alphafibre**, Weyburn – targeting the emerging field of natural fibre composites.
- **Biolin Research**, Saskatoon – developing the process of utilizing flax straw in the production of linen and other products for the textile and geo-textile marketplace.
- **Bioriginal Food & Science Corporation**, Saskatoon – processing of nutraceuticals.
- **Durafibre**, Canora – processing flax fibre for the manufacturing of specialty papers and fibre board for the auto industry.
- **Fytochem Products Inc.**, Saskatoon – developing plant extracts and phytochemicals as functional ingredients.
- **Nuform Packaging**, Tisdale – markets recycled fruit packaging to U.S. and Canadian fresh fruit industry.
- **Parkland Strawboard**, Kamsack – in the developmental stages of production of wheat-based strawboard.
- **Parrheim Foods**, Saskatoon – manufacturing of pea starch, protein concentrates, and dietary fibers by wet-processing methods without adding chemicals to the finished products.
- **Urban Forest Recyclers (UFR)**, Swift Current – manufacturing of commercial egg trays from recycled materials including flax and canaryseed straw as fibre strengtheners in their processing.

A number of larger international companies that are actively involved in crop research and bio-product development have offices in Saskatchewan (i.e. Advanta, Aventis, DowAgro Sciences, Monsanto Canada, Pioneer He-Bred).

There are many organizations in Saskatchewan actively working in moving this sector forward. These organizations include the University of Saskatchewan (Agriculture and Bioresource Engineering Department), Prairie Agricultural Machinery Institute (PAMI), Agriculture & Agri-food Canada Research Station, National Research Council / Plant Biotechnology Institute, POS, Saskatchewan Research Council, Petroleum Technology Research Centre, Pilot Plant Corp, Department of Applied Microbiology and Food Science, Department of Biology, Faculty of Pharmacy, Faculty of Medicine, the Drug Research Institute, Western College of Veterinary Medicine, Veterinary Infectious Diseases Organization (VIDO), and the Saskatchewan Flax Development Commission.

1 The Canadian Agricultural New Uses Council (<http://www.cyg.net/~canuc/>)

2 Alberta Agriculture, Food & Rural Development, "Agri-Food & Fibre Facts, Trends & Opportunities Future Directions 1996" (<http://www.agric.gov.ab.ca/food/process/agrifood.html>)

3 BioProducts Canada Inc., "Making the Transition to a Bio-Based Economy", www.bio-productscanada.org

4 PAMI, POS, SRC, University of Saskatchewan, "Non-Food Processing – Opportunities for Saskatchewan", October 1996.

5 "Realizing the Economic Potential of UK-Grown Industrial Crops: A Review by ACTIN," April 2001, www.actin.co.uk

6 National Renewable Energy Laboratory, "NREL at a Glance," www.nrel.gov

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