

# **Alberta Agriculture Industry Proof of Concept**

DRAFT

**Report prepared for the Institute for Agriculture  
Forestry and the Environment**

Prepared by:

Carrie Selin  
Ruth DeSantis  
Darcy Willis  
Dale Kaliei  
Tom Goddard

Reviewed by:

Mike Kennedy  
Andrew Anderson

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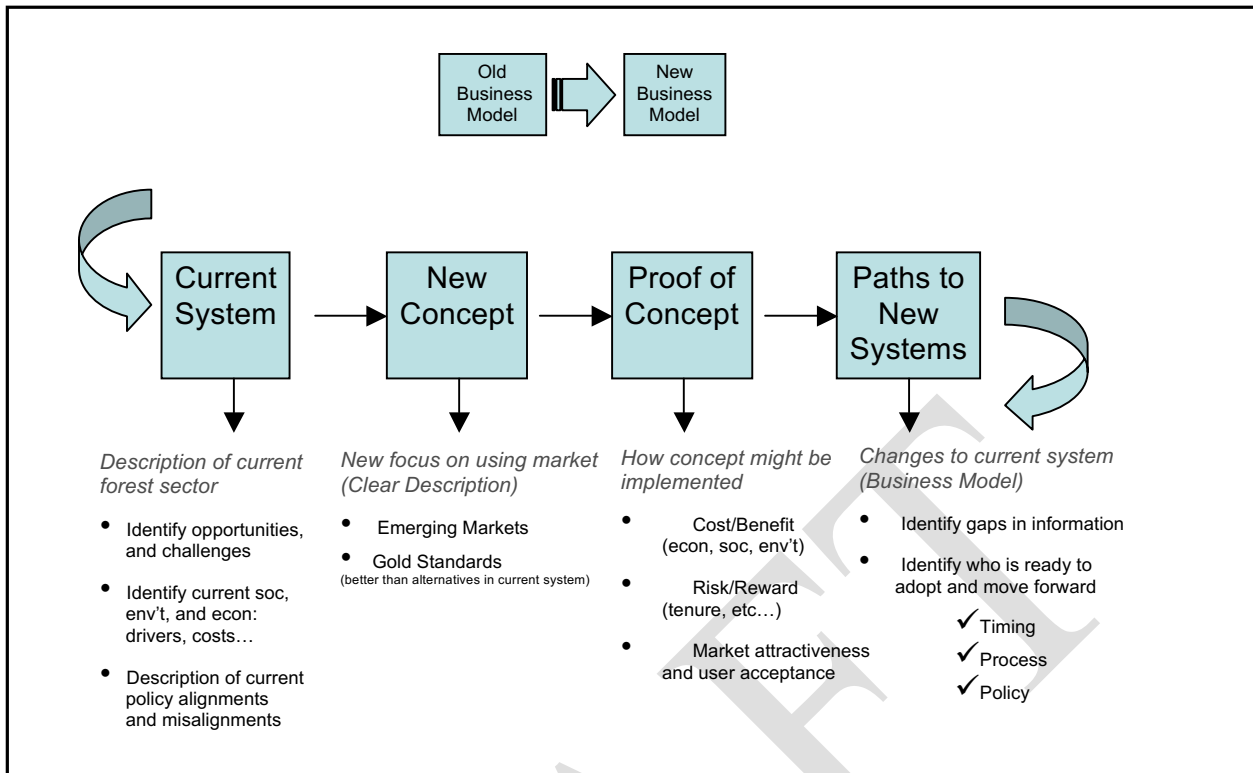
## Context

The Institute for Agriculture, Forestry and the Environment (IAFE) was established to be a catalyst to achieve the Alberta Government's objective to "green growth" and show Alberta as an environmental leader and innovator. The need for attention to green growth arises from present and anticipated pressures on Alberta's environment and natural resources such as unprecedented economic activity and population growth. Furthermore, public attention to environmental impacts and demands from domestic and international consumers is compelling industries and government to respond. The IAFE's role is to assist the Government of Alberta to put in place policies and processes that use a market approach to enhance and communicate environmental performance in Alberta's agriculture and forestry industries. This will support the accompanying goal of making and branding Alberta as an environmental leader as well as building the competitiveness and market strength of the agriculture and forest industries. In addition, the forest industry has been identified as having a significant role in achieving environmental outcomes as a large land manager in Alberta.

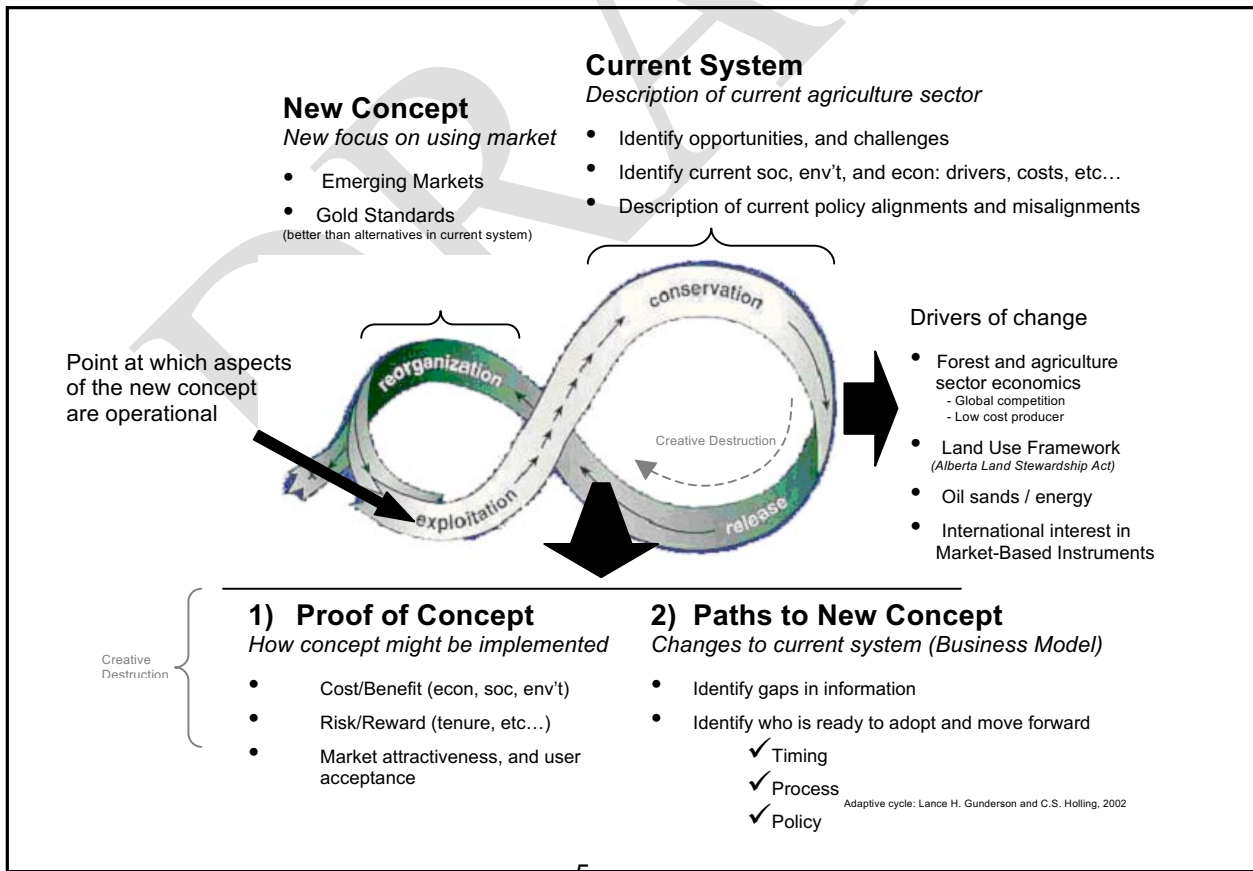
The IAFE has developed a Proof-of-Concept (PoC) for the Alberta agriculture industry. This PoC is focused on determining where the industry is located (relative to policy, economic, and cultural/social drivers) in relation to a market approach to Ecological Services (ES) in agriculture for Alberta. To this aim ARD and the IAFE have reviewed relevant literature and engage Alberta agriculture producer industry members and other experts to identify opportunities and challenges that relate to the current operating environment and a market system for ES in the province. This work will help inform the IAFE's recommendations to cabinet in March 2010. Industry and expert input related to forestry and agriculture is deemed to be a necessary component to the Institutes work if their recommendations are to be accepted and successful in application.

The agriculture PoC addresses the current state of agriculture (inc. a policy review, as well as an examination of the economic, political, , environmental and social drivers associated with the current agriculture industry business model). As discussed above, proofing this concept with industry is considered paramount if such a change is to be successful. To this end, engagement sessions were conducted to gain an understanding of industry perceptions and experiences in regards to their current policy environment and a proposed market-based policy environment. These views are discussed in this report. Finally, this report concludes with a discussion on the paths that Alberta's agriculture industry has taken and is recommended to take in order to support the success of environment, social and economic objectives through the market.

Two diagrams have been created to present the flow of process and thought for the agriculture proof of concept. The first of these diagrams is a linear representation to simplify the thoughts and concepts. The second diagram presents the same information as the first except that it accounts for the adaptive process that will be necessary when approaching environmental sustainability and economic success using market-based instruments for Ecosystem Services. In this diagram the current system is peaking, unable to address the complexity of economic, environmental, and social issues confronting conventional forestry. Certain drivers are pushing the system to collapse and through creative destruction a more robust systems can be created. The agriculture PoC is meant to provide directional guidance to a new system (see Figure 1 & Figure 2).



**Figure 1: Linear Proof-of-Concept Process**



**Figure 2: Adaptive Cycle Proof-of-Concept Process**

## 1. Introduction

The agriculture industry has been considered a key part of Alberta's economic, social and environmental landscape since the province was established. While Alberta's agriculture industry has experienced many challenges related to changing markets, economic conditions and operating environments (social, political, and environmental), the sector has adapted to remain competitive and provide a stream of benefits to Albertans.

The current situation, however, is posing considerable challenges to the agriculture industry. Alberta's agriculture industry faces unprecedented competitive pressures—dramatic changes in markets, economics, competition and the local operating environment—coupled with an overly complex regulatory environment that affects all agriculture sectors and jeopardizes the long term economic and environmental benefits provided when agricultural lands are managed.

- Global and North American markets for the full range of products that Alberta produces are depressed and prices are projected to remain low for at least the next couple of years.
- Economic factors such as the global commodity markets, North American trade restrictions, exchange rates and regional cost structures are all exerting increased pressures on Alberta's Agriculture Industry. The health of Alberta's agriculture industry is a reflection of global processes
- Overall employment in the agriculture industry is decreasing. The proportion of employed youth aged 15 to 24 years declined from 13.0 % in 1998 to 12.1 % in 2008 while the proportion of employees aged 55 years and over increased from 29.2% in 1998 to 36.9 % in 2008. This trend indicated the possibility of a future labour shortage for agriculture (AEI, 2009b).
- The recent downturn in the global economy and environmental conditions have influence the profitability of agriculture in Alberta. Net income for Alberta farmers increased in 2007 from \$108.5 million to \$451.6 million in 2008. However the outlook for these industries in 2009 is not encouraging. For instance dry conditions, frost and abnormally low temperatures during the 2009 growing season have significantly hampered crop growth in much of northern, central and the southern regions of the province. The livestock industry in particular has been affected by higher feed costs and reduced prices resulting from the strong Canadian dollar. There has also been significant uncertainty surrounding the Country of Origin Labelling law in the United States (AEI, 2009).

The IAFE has engaged the Agri-Environmental Partnership of Alberta (AEPA) to work with stakeholder groups to identify the opportunities and challenges in Alberta's agriculture industry to inform policy decisions while transforming the industry. To begin this work information is needed regarding the nature of the current agricultural system and the elements that might facilitate and/or inhibit change to realize environmental outcomes. This paper provides an overview of the fundamental economic, agriculture policies, environmental policies, cultural/social drivers and governance structure that advance and/or constrain industry transformation. This transformation is anticipated to facilitate a new business environment that will assist the agricultural industry in reaching environmental outcomes while building a profitable, sustainable and competitive industry.

### **1.1. A New Concept**

Regulatory requirements in the agriculture Industry have increased over time as a means of addressing changing environmental and social values; however, the efficiency and effectiveness of such prescriptive policy has come under question. Policy instruments that take advantage of market incentives and fiscal mechanisms are now becoming carefully considered as alternatives to conventional command and control regulations. Traditionally, unless specifically regulated, certain ecological considerations were not generally managed for, only imposing more costs on forest companies. Market instruments may provide the appropriate incentive to integrate such ecological consideration into the forest business model. However, market instruments are still new ground for both government and industry. If substantive change is to occur than market-based policy needs to be tested with government (public), industry, NGOs and Aboriginal groups in Alberta. The IAFE's PoC is one vehicle to make this happen.

## **2. Characterizing Agriculture in Alberta**

The Agriculture industry is a mature industry in Alberta. Agriculture has played an important part in the development of Alberta and has contributed to the social and cultural atmosphere. Alberta produces almost half of all Canadian beef. Wheat and canola are also primary farm crops for Alberta. Alberta producers view themselves as stewards of the land. They also take pride in providing customers what they want. Despite, the active role of the agriculture industry in Alberta this industry is facing considerable constraints to future operations. Many producers view financial viability as the number one threat to their farm operations. The costs of farm inputs, restricted market access and the high Canadian dollar all contribute to the financial viability of Alberta producers. This industry is also faced with an aging population which will likely affect future labour supplies. Employment in the Agriculture Industry is expected to grow on average 0.9% annually from 2009 to 2013. The industry will provide Alberta with no more than 1.7% of all new jobs between 2009 and 2013.

## **3. The Current State of Alberta's Agriculture Industry**

### **3.1. The Current State of Producer Economic Decisions**

The key elements of the business environment that will facilitate development and implementation of policy instruments relates to recognizing the current business environment while considering farm production and motivation to change. The fundamental first step in eliciting practice change<sup>1</sup> on the part of the individual business is to understand the decision process of managers. This understanding begins with addressing the following questions: *what informs producer's decisions? and what motivates them to change?* The manager's analysis for change varies from "gut feel" to detailed analysis. Underpinning each of these extremes, however, is a consistent set of principles regarding perceived value, cost and risk. Whether the decision relates to a short term operation plan or a long term investment in a practice change,

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<sup>1</sup> Practice change refers to producers doing something differently. It includes practices, processes, governance, culture and business decision making.

the same principles apply. The evaluation of a business opportunity revolves around the elements that apply specifically to that business. The elements of the decision include:

- The upfront “investment” in capital, production inputs or both,
- A tangible return or benefit(s) to the business investments,
- Consideration of benefits that are intangible (ie. the value associated with the practice such as public views of the producer as a “good steward”), and
- The consideration of societal benefits (ie. the value that society puts on the business’ contribution to an attribute they desire such as clean air, clean water and safe food).

Conceptually, the math behind the manager’s decision, involves the calculation of a “net present value (NPV). If the NPV is positive, the practice change is profitable and implemented, however, if the NPV is negative, than the producer would not accept the proposed practice change. While this process is not often done formally, the essence of this calculation is embodied in every economic evaluation and choice. If the NPV considering the producer’s tangible and intangible benefits are insufficient than accepting the practice would put the business on the path of being unsustainable and uncompetitive. The manager would not implement the business decision because there are no benefits associated with the change in practices, process, or governance. Furthermore, the environmental and societal benefits are not usually considered in business decisions.

The above offers insight into the rational behind individual decisions. More importantly, this decision process signals the need to answer the following questions:

1. are business managers motivated to be *stewards*?,

Rationale decision making suggests that a manager would not undertake practices that are perceived to diminish the productive, economic or financial value of the business over time. *Stewardship* implies that the methods of operation maintain sustainability<sup>2</sup>. The importance of knowledge is readily evident. If a manager is not aware that a particular practice diminishes sustainability than a manager’s decisions are not based on a holistic analysts. The effect on the benefits is not accounted.

2. how does *risk* affect business decisions?,

*Risk* affects the evaluation and decision process through the estimation of benefits. When an outcome is uncertain, its expected value diminishes. Again, the role of *knowledge* in clarifying the implications of risk will bring the expected benefits in line with a long term achievable *average*.

3. why do some producers adopt change while others do not?

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<sup>2</sup> Sustainability refers to maintaining balance of economic, social and environmental outcomes within the system to ensure it is productive now and for future use. (GET DEFINITION FROM GLOSSARY)



Every farm is different in terms of its assets, financial position and productivity. Managers also differ in their knowledge and evaluation skills, so decisions of practice change will yield different results. Moreover, perceptions of risk vary among managers creating greater diversity in the results of evaluations and observed decisions.

4. what would it take to elicit practice change?

- Identify and develop practices that have environmentally beneficial outcomes and positive NPV's ,
- Build on practice changes that are known or recognized by managers as these will have a better implementation rate,
- Increase managers knowledge regarding the real implications of management decisions (environment, social, cost),
- Establish an understanding that regulatory burden is part of economic decisions, and
- Incorporate the diversity of the industry into policy instrument design.

Given the diversity of businesses, and the ensuing diversity in practice change and evaluation, flat rate incentives will create winners and losers (ie. some businesses will receive unearned windfall gains, while others will unknowingly experience unearned losses). It is plausible that incentives paid under this structure will exceed what is required to elicit the desired outcomes.

Manager's decisions vary and are reflected in the construct of individual businesses. This has resulted in a diverse agriculture sector. Businesses in this sector vary according to elements such as:

- specialization and/or mix of commodities produced,
- technology investment,
- production attributes of the land base,
- intensity and efficiency of production systems,
- unit cost and financial and capital structures,
- size and/or scale of operation,
- location to industry infrastructure,
- business knowledge, skill sets, acumen and risk preferences,
- innovation, and
- potential to create valued environmental attributes.

These items also inform the capacity of the industry to transform and adopt new business practices. This list outlines the diversity within the sector; however, there are a few key commonalities among these businesses, including:

- The recognition that competition creates pressure to reduce unit costs,

- Production is driven by an evolving set of consumer demands for specific and/or differentiated products, and
- Technology can offer opportunities for business change, economic efficiency and the ability to achieve environmental objectives

Understanding the process of business evolution is the last consideration in creating effective policy instruments. Essentially, businesses invest and re-invest in capital. With each investment, they strategically acquire a technology set used to cost effectively produce. At any point in time, the industry is at various stages of this re-structuring cycle. This provides both opportunities and constraints to implement environmentally-related practice changes.

Desired behavior at the industry level reflects a collection of individual businesses subscribing to a practice change. In order to achieve desired outcomes, it is necessary to put the practice changes into the context of the business environment. Furthermore, an understanding of the evolution of the business environment may improve the adoption of desired practices and achieving environmental outcomes.

Policy and policy instruments are likely to be more effective when diversity and commonalities are recognized. However, development of market structures (ie. information systems, standards, price discovery) to accommodate the differentiation and delivery of desired products (clean air, water, biodiversity) sets generally lags behind the pace of demand. This creates significant short and long term risk associated with a differentiated or branded production focus.

Currently, farms do not sell clean air, clean water, or wildlife habitat. However, some producers have implemented practice change to account for environmental attributes. This practice change is likely to proceed as long as it can be demonstrated to improve cost effectiveness based on its own merits. Practice change decisions today are largely based on a combination of regulation and incentives.

Achieving environmental outcomes on the provincial scale will depend on the objectives or/and goals, scale and participation. Achieving environmental outcomes in localized areas depends on a portion of producers contributing to the objective. For example, consider a group of agricultural producers operating in a watershed, where only a portion of the producers would need to be engaged to achieve a regional clean water objective. Essentially, meeting environmental objectives will depend on a variety of elements that combined influence achieving outcomes.

#### Section Summary

- Elements of a business decision involve considering the up-front investment, tangible returns and societal benefits. The non-monetary and societal benefits are usually not well understood to inform business decisions.
- Different capabilities exist among producers, so the ability of managers to make decisions varies and will influence the ability to achieve environmental outcomes.

### **3.1.1. International Markets and Trade Source**

Alberta is bound by measures under trade agreements and conventions signed between the government of Canada and other jurisdictions globally. Free trade agreements (FTAs) are vital to Alberta's agriculture industry because they reduce barriers to trade and maximize opportunities for Alberta businesses in foreign markets. Trade statistics released by Statistics Canada, in 2008, indicate that Alberta agri-food exports reached a record high of \$8.1 billion, an increase of 25.6 per cent over \$6.5 billion in 2007 (AARD, 2008a).

The top five Alberta agri-food exports in 2008 (ranked by value) were wheat (\$2.1 billion), canola seed (\$1.6 billion), beef (\$1.1 billion), live cattle excl. purebred (\$542 million) and pork (\$342 million). Exports of primary commodities (animals and crops), worth \$4.8 billion, played a significant role in Alberta's export performance in 2008. Growth in these exports were driven mainly by the high prices of grains and oilseeds, particularly wheat and canola seed. On the other hand, exports of live cattle declined in both, value and quantity.

Value-added exports represented 41 per cent or \$3.3 billion of Alberta's total agri-food exports in 2008. Among the value-added products showing increases were beef, honey, refined sugar, tallow, malt, wheat flour, oilseed cake and meal, refined canola oil, beer, milled cereals and processed vegetables and fruits. Of the total Alberta agri-food exports 39 per cent was destined to the United States (\$3.2 billion). Japan was the next largest export market (\$1.2 billion), followed by China (\$639 million) and Mexico (\$618 million). Closer ties with Asia and the Pacific trading nations and their growth engines are seen by many to be an opportunity for Canada (AARD, 2008c).

Canada is currently pursuing many new FTA's including with the BRIC nations (Brazil, India and China) and is in the first stages of negotiations with the European Commission (EU) on a FTA agreement. The Canada-EU FTA Negotiations are especially significant in that for the first time Provinces are permitted to participate in the negotiations where provincial interests are concerned. These FTA's are important in reducing tariffs among our trading partners providing the opportunities for industry to diversify their markets and their products.

### **3.1.2 Cost Considerations**

Alberta's agricultural industry like other industries is subject to the effects of globalization. The decrease in the costs of communications and transportation means that the markets for Alberta's agriculture industry are increasingly global focused. Producers are facing pressures to reduce costs in order to compete in the global marketplace. Farmers often aim to secure land with low costs, a commodity in demand and low equipment cost. Farmers are increasingly aiming to tailor their farming practice and products to compete with other producers (City of Edmonton, 2006).

### **3.1.3 Energy**

Energy represents another input cost for the agriculture industry. Rising energy costs impacts all of Alberta's industry sectors to a lesser or greater degree depending on their relative proportion of use and overall dependency. However, some Alberta agriculture producers benefit from the Alberta Farm Fuel Program and Farm Fuel Distribution Allowance. Both these

programs reduce the cost of fuel used in farm vehicles by eligible Alberta farmers, providing an exemption from the fuel tax. A farmer is eligible with a gross annual farm production worth at least \$10,000, or \$5,000 to \$9,000, if the only other income sources are CPP or Old Age Security (AFE, 2009a; AARD, 2008b).

### **3.1.4 Labour**

This industry is expected to continue to emphasize more value-added production through food processing, and to continue to diversify into alternative crops. While there will be a more diverse range of employment opportunities in agriculture operations, such as technical agronomic, management, marketing and product development occupations, the industry is expected to lose workers to other sectors. These sectors include the oil and gas industries, where wages are higher and jobs are plentiful. Employment levels in primary agriculture in Alberta have been in long-term decline because of the shift from small family farms to large-scale family and corporate agricultural enterprises. Labour issues in the rural economy go beyond the attraction and retention of agricultural workers. Young people need to be retained in rural communities and new workers need to be attracted to maintain vibrant communities that provide a broad range of services. Labour shortages are likely to continue for primary agriculture in Alberta (ARD, 2007).

### **3.1.5 Transportation**

Freight and transportation is a significant cost both in terms of delivering raw materials as well as getting finished products to market. Alberta's vast resource land base and temporary infrastructure is a competitive disadvantage particularly considering our dependence on export and proximity to our main markets. Freight costs have increased. The phenomena of truck transport shortages and increasing fuel costs have increased freight costs.

Recognizing the importance of transportation, most governments are working to address competitive challenges. Investment by government in infrastructure has been identified as a priority but the level of investment has been limited in Alberta. Some competing jurisdictions have been far more direct in addressing this challenge by assuming responsibility for road building in turn creating a competitive advantage over Alberta.

Other indirect initiatives include programs to harmonize regional transportation policies (i.e. truck weights and configuration) and build cooperative agreements with neighbouring jurisdictions to reduce shipment delays when crossing borders have been initiated. Inter-provincial and international transportation standards have also been seen by many as a means to improve efficiency.

## **3.2. The Current State of Agriculture Policy**

This section provides a high-level overview of agricultural policy in Canada and Alberta with possible environmental implications. To varying degrees, agricultural policies in developed regions, and in many underdeveloped regions, have had perverse environmental impacts. A 2001 study of the use of market based instruments shows that \$950 billion was consumed in international price-based instruments, 35 percent of which was used by agriculture.

*“While many of these subsidies are in sectors with potentially significant environmental impacts such as forestry, water and agriculture, most are targeted towards resource*

*exploitation and industry development rather than towards environmental management. Where these subsidies actively promote environmental externalities they are referred to as perverse subsidies.” (OECD)*

In Canada, the design of major programming targeted to the sector has varied over time. The former Gross Revenue Insurance Plan (GRIP) program, for example provided gross revenue support to producers, a direct production incentive. More recently, whole farm income support program designs have been initiated to help reduce the influence of payments on production decisions. However, even these programs have the effect of interfering with structural adjustment and distorting resource allocation decisions. They also distort market signals related to risk, including environmental risk. Smaller provincial programs also have the potential to create perverse environmental affects. An example is farm fuel subsidies that could cause anomalies in the use of fuel for agriculture and encourage higher than market clearing levels of production and energy use.

Various national and provincial programs have been implemented to promote sound environmental practices in agriculture. There have been some successes such as the Environmental Farm Plan Program, the implementation of conservation easements, and the Canada Alberta Farm Stewardship Program, for example. Yet, the portion of agri-food policy resources devoted to environmental outcomes remains small compared to those programs that are shown to generate perverse effects. Furthermore, policies developed to address environmental concerns have focused on awareness and Best Management Practices (BMP's) instead of environmental outcomes. The fact that the agriculture sector continues to be regarded as a negative contributor to the environment indicates that environmental programming has not been entirely successful.

The Organization for Economic Co-operation and Development (OECD) gives Canada a poor rating on environmental performance in agriculture:

*Canada has a poor record on environmental issues related to agriculture. Canada ranks 22nd out of 28 OECD nations on pesticide use, 25th out of 28 on commercial fertilizer use and 16th out of 28 in terms of livestock (cattle, pigs, sheep and goats) (OECD, 2008).*

The OECD measures and conclusions could be argued. However, the OECD is a highly respected source for policy assessment. Other countries and jurisdictions have made gains in terms of policy reforms that move away from policies and programs that distort resource allocation. For example, the EU has moved away from direct commodity price supports to direct payments accompanied by cross-compliance requirements. Many of these new policy reforms involve environmental outcomes.

Australia and New Zealand have move from of the familiar realm of direct farm support due to environmental degradation or loss. In Australia, a national water crisis influenced change and encouraged the development of environmental markets with less distorted policy approaches. For instance, the market system in Australia to manage water resources resulted in innovation profit, irrigators surviving recent droughts, and the movement of water to higher environmental value uses (Young, 2008).

Many developed countries are making progress in overall agriculture policy reform however Canada is seen as regressing on agriculture policy:

*Over the past six years it [Canada] has been almost alone among OECD countries in backtracking in the protection provided to its farmers. Canadian farmers now receive more generous support than those in the United States and Mexico, but less than their counterparts in most OECD countries. This has had heavy recurrent budgetary costs (CAD 3.8 billion or 16 600 per farm per year in 2006, for example), thankfully in a period of surpluses. But surely the burden of proof of net benefits has to be set higher for such spending. It needs to be more strictly controlled, particularly in view of the risk of moral hazard behaviour by farmers growing use to living off government handouts. Given high agricultural prices, the time is ripe for setting all farmers free to test out their capabilities in the world marketplace, not just grain producers as the government is trying to do (OECD, 2008).*

In this respect, farmer protection and agriculture policy, Alberta has become a major contributor to the targets of OECD criticism of Canada.

In terms of government involvement to promote environmental outcomes in the agriculture industry by using incentives or subsidies, relevant World Trade Organization (WTO) rules are instructive. Under these rules, governments can provide incentives to specific environmental programs to a level that covers the costs of the program. Any financial assistance in excess of these costs would be regarded as trade or production distorting subsidization.

### **3.2.1. Federal Jurisdiction and Role Related to Agriculture**

The federal government plays a major role in the agriculture industry. The federal government provides support in terms of financial, human and knowledge means. Federal agriculture policy influences provincial decisions as the Federal government contributes most of the financial resources for federal-provincial programs. The federal government is responsible for numerous acts that influence the agriculture industry in Canada (see Appendix A). The department responsible for the administration of this work is Agriculture and Agri-Food Canada (Agriculture and Agri-Food Canada 2008).

The most recent policy agreement between the federal and provincial government is Growing Forward. Growing forward is a partnership between the federal government and the provinces. The goals of growing forward are to build a profitable sector through the achievement of three strategic outcome: a competitive and innovative sector, a sector that contributes to societies priorities and a sector that proactively manages risks.

The goal of growing forward in terms of the environment is to develop and improve sustainable on farm practices that will deliver both environmental and economic benefits for the sector. The environmental initiative within growing forwards will have \$199.5 million in funding to focus on new agri-environmental knowledge, programs and initiatives. The following is a list of federally funded initiatives, part of the environmental plan for the Growing Forward Agriculture Policy Framework.

- Agri- environmental science initiative will improve the scientific understanding of agriculture's interaction with the environment.

- The knowledge and information tools initiative is designed to enhance land-use decision making for farmers.
- The sustainable farm practices initiative will be supported through the Innovative Approaches Initiative. Projects funded under Innovative Approaches address the need for technical assistance related to environmental planning, and explore new program delivery models including tiered/market-based approaches and landscape-based planning.
- Performance Measurement and Reporting is an initiative to improve AAFC's ability to report on the sector's environmental performance.

### Section Summary

- Agricultural policies can and have been shown to create perverse effects on the environment
- Other developed nations are reforming their agricultural policies to achieve environmental objectives.
- Canada is performing poorly in regards to agriculture policy reform.

### **3.3 The Current State of Agriculture Environmental Externalities**

The above sections highlight both the decision making processes for agriculture producers, the policies that influence these decisions and the growing movement to reform agriculture policy. This section focuses on the environmental externalities that have resulted because of agriculture production.

Alberta is a province, which derives significant cultural and economic benefits from agriculture. Agriculture is widespread throughout the province and dominates what used to be a mix of prairie lands. Alberta's primary agricultural products include beef cattle, canola and flax, wheat, dairy, hogs, oats, rye and barley. Broadly speaking, these goods can be classified as one of two things: crops or livestock. Given the general similarities in terms of activities within these classifications, these two general descriptors will be used to examine the environmental impacts and externalities associated with Alberta's agriculture sector in the section that follows.

Table 1 highlights the key activities that drive negative externalities in the Agricultural sector. This table illustrates the linkages between the various activities, the threats that these activities cause, the environmental stresses that result, and the degradation upon the natural assets (and their associated ecosystem services). It is ultimately the loss of these ecosystem services that often represent the negative externality. In addition to the noted tangible costs, the various ecosystem services which have the potential to be impacted are identified as intangible costs. The impacts to these ecosystem services should be considered a large negative externality. While direct causality between the activity and the extent of the impacts on ecosystem services can be challenging to identify, when these ecosystem services are impacted by the activities listed and not internalized, it is a concern as it represents an externality.

However, beyond simply the trends, it is important to note several of the other activities. First, it should be identified that land conversion is the activity with the greatest impact upon ecosystem services; once the initial decision to convert land-use has been made, it not only has considerable ramifications upon the various services the land can provide, but it is also very costly to reverse. Of particular note within the conversion realm, is the continued loss of wetlands. These highly valuable forms of natural capital provide an array of services and are key to retain. Factory feedlots remain a concern with respect to water and energy use, as well as waste emissions and GHG emissions. Such industrial livestock practices have serious consequences and costs, many of which are not borne by the farmers but by the public at large (even globally). Lastly, two ecosystem services (and the activities that generate negative externalities when these services are degraded) are worth flagging. First, it is important to recognize that water constraints are likely to continue to increase in the coming decades through a combination of decreased supply (under climate change scenarios), and increased demand (both through population growth, food demand and energy demand). As a result, any activity which impacts water or the ecosystem services that help to regulate water, should be of utmost concern. This means that land-use, irrigation and factory farms should be targeted, in particular, for their negative externalities. Second, the loss of pollinators is of grave significance to the agricultural crop sector. Continued use of pesticides has the potential to degrade the quality of an immensely valuable service currently performed by insects. Without pollination, food system security would be jeopardized and this would ultimately cause significant costs. Figure 3 provides an illustrative rendition of how the various activities act as indirect drivers to threats, as well as the stresses that these threats place upon ecosystem services.



**Table 1: Summary Table of Activities and Negative Externalities in the Agricultural Sector**

Stage	Activity	Stress	Impact / Result	Description	Tangible costs (present and/or future) to land user and the public	Intangible costs - Ecosystem Services Affected (negative externalities)	Trend
Research	Research	None	Potential to perpetuate poor practices	While research does not have a direct impact on ecosystem services, it does indirectly influence activities and therefore can be a significant driver.	Future opportunity cost	Potentially any/all	Overall increase; provincial decrease; slight federal increase; industry large increase. Major areas include: Food/human nutrition, resource management, plant physiology / management (1)
Land conversion & use	Initial land clearance / conversion	Habitat loss and degradation	Extensive ecosystem service loss - see report	Conversion of land from wetlands, forest or native prairie to agricultural use reduces availability of land important for provision of several ecosystem services.	Numerous	Gas regulation, climate regulation, disturbance regulation, water regulation, erosion / sediment control, waste treatment, biological control, soil formation, primary production, nutrient cycling, pollination, habitat / refugia, water supply, food production, raw materials, genetic resources, aesthetic, spiritual & traditional use, science & education, recreation	Agricultural conversion is relatively stable (with some increase): some indication of continued wetland losses (1, 2); However, conversion of intact native forest into secondary growth has slowed, but is still considerable (3)

Cropping complexity / monocropping	Biodiversity loss, invasive species, soil degradation	Land becomes more human dependent and less resilient (greater susceptibility to disturbance events)	Monocultures grow faster and require more water than other crops. Reliance on one or a few key crops results in decreased species diversity and vulnerability to pests	Increased input costs; decreased land productivity (more \$ to get 1 unit of output); increased insurance costs	Disturbance regulation, water regulation, biological control, soil formation, nutrient cycling, pollination, habitat / refugia, genetic resources	UNKNOWN
Crop selection	Biodiversity loss, invasive species, soil degradation, biogeochemical disruption	Land becomes more human dependent and less resilient (greater susceptibility to disturbance events)	Crop selection generally sets the stage for other input/output requirements; Use of GM crops reduces genetic variability of plant species on the landscape.	Increased input costs; decreased land productivity (more \$ to get 1 unit of output); increased insurance costs	Gas regulation, climate regulation, disturbance regulation, water regulation, biological control, primary production, nutrient cycling, pollination, habitat / refugia, genetic resources, aesthetic	Increasing; Canada is currently the 5th largest GMO crop producer in the world at 7.6 million hectares.(1) Canola and wheat account for 73% of Alberta's revenue from crops. (2)
Factory farming / feedlot (including feed)	Manure and urine wastes; water, energy & feed requirements (ecological footprint); GHG production	Poor water quality; disease; climate change, additional land use conversion abroad	Ammonia production by livestock can cause negative impacts when deposited into surface waters or volatilized.	Increased water purification and health care costs (both animals and humans); increased insurance costs; ES loss abroad	GHG gas production / climate regulation, waste production / treatment, biological control / disease, eutrophication / primary production, increased nutrients / nutrient cycling, habitat / refugia,	Generally increasing; 2009 numbers: 5.38 million head of cattle, 1.63 million head of hogs, 127,000 head of sheep; while this was down from 2008, it is up considerably since the 1970s (e.g. ~ 3 million cattle) and even 2000 (~4.75 million cattle). (1,2)

						water supply, aesthetic	
	Grazing intensity (overgrazing)	Soil erosion; soil compaction; biodiversity	Land becomes more human dependent and less resilient (greater susceptibility to disturbance events)	Overgrazing reduces plant growth and biodiversity of vegetation while providing a competitive advantage to only those species adapted to grazing disturbance conditions	Increased input costs; decreased land productivity (more \$ to get 1 unit of output); increased insurance costs	Gas regulation, climate regulation, disturbance regulation, water regulation, erosion / sediment control, waste treatment, biological control, nutrient cycling, habitat / refugia, genetic resources, aesthetic, spiritual & traditional use, science & education, recreation	UNKNOWN; though Statistics Canada stated that nearly 70% of farmers reported using rotational grazing practices, with Albertan farmers having the highest share adopting rotational grazing practices in larger farms (1)
Production	Fertilizer application	Water quality impacts	Poor water quality; disease	Use of fertilizers can introduce excess levels of nitrates and phosphorous	Increased water purification and health care costs	Waste / waste treatment, biological control, primary production, nutrient cycling, habitat / refugia, water supply, aesthetic, recreation	Decreasing; Census of Agriculture data suggests not only are the total number of farms applying manure decreasing (down 1% since 1996), but the total area under fertilizer treatment is also decreasing (down by 28% since 1996)
	Pesticide application	Water quality impacts; biodiversity loss; degradation of soil microfauna	Loss of genetic resources; loss of pollinators; pesticide-resistant insects; teratogenic impacts on humans (cancer); loss of soil quality	Pesticide use reduced insect and pollinator populations, leads to pest resistance, diminishes water quality due to runoff and alters	Increased need for pesticides; health care costs; water purification costs; less productive soils (and therefore	Waste treatment, biological control, soil formation, primary production, nutrient cycling,	Increasing; while the number of farms applying herbicides has decreased since 1996, the area has increased by 6%. Furthermore, both the number of farms and the area of insecticide-treated land has increased by 32% and 64% respectively. Finally, fungicide use has also increased by roughly 20% in area since 1996.

			natural rates of nutrient cycling	less revenue)	pollination, habitat / refugia, water supply, food production, genetic resources, aesthetic	
Antibiotic application	Bacterial resistance	Increased virulence in pathogens; ineffective antibiotics	Antibiotic use drives further resistance in insects which requires increasingly strong and complex doses. Ultimately can lead to major loss of life in livestock and dangerous and costly human pathogens	Increased antibiotic costs, increased health care costs; deaths	Biological control / disease, water supply, genetic resources	UNKNOWN: High application rates (but unknown trends). One report for hogs cited a figure for Alberta between 80 and 90% (1)
Water use - Irrigation, water diversions, livestock watering	Water quantity impacts; groundwater draining	Less water available for other uses; less water available in drought years	Inefficient use of freshwater for irrigation, domestic purposes or livestock consumption decreases overall freshwater availability	Resource scarcity conflicts; increased water costs	Disturbance regulation, water regulation, primary production, nutrient cycling, habitat / refugia, water supply, food production, genetic resources, aesthetic, spiritual & traditional use, science & education, recreation	Increasing. (1) Historical levels within Southern Alberta were: 90,000 acres (1918), 450,000 acres (1950), 692,000 acres (1970), 1,037,137 (1980) and 1,325,438 (2004); Alberta total = 1,600,000 acres (2004); the most commonly used irrigation systems for crops are sprinklers and guns; 26.7% of farmers reported using BMPs for water management in AB in 2001, which is below the national average of 31% (2)
Tilling (topsoil management)	Topsoil loss (quantity); soil biodiversity loss (quality); soil compaction;	Poorer soils	Use of conventional tillage techniques can lead to topsoil erosion and loss and diminished soil carbon storage.	Increased input costs; decreased land productivity (more \$ to get 1 unit of output)	Gas regulation, climate regulation, disturbance regulation, water regulation,	Evidence to suggest that practices are improving (increasing area left fallow, no-till practices, etc.) (1)

					erosion / sediment control, biological control, soil formation, nutrient cycling, habitat / refugia, genetic resources	
Machinery use (physical impacts of tilling harvesting)	Topsoil compaction	Poorer soils	Large, heavy machinery results in topsoil compaction; this in turn has hydrological impacts	Decreased land productivity (more \$ to get 1 unit of output); increased machinery costs	Water regulation, erosion / sediment control, habitat / refugia, water supply	Increasing somewhat. (1) Labour productivity has increased by 4.5% per year since 2000, while capital expenditures have grown 1% per year, from \$936M in 2000 to \$1,006M in 2008
Energy Use (motive and non-motive) throughout farm operations	GHG emissions	Climate change, crop damage, ancillary damage (flooding, drought, severe storms, etc.)	Energy use throughout farm operations typically draws from carbon-intensive energy sources, along with conventional fuel, all of which emit GHGs	Crop and property damages, Increased insurance costs; increased energy costs	GHG emissions / climate regulation, aesthetic	STABLE: Both intensity and absolute energy use (as well as CO2 values) appear to be largely stable (1)

### **3.4 The Current State of Environmental Policy Impact on Agriculture**

Environmental consciousness, public perceptions and values are expected to play an increasing role in the development of agricultural policy. Society has moved from the awakening of the 1960s (Rachel Carson's *Silent Spring*) through the activism of the 70s and 80s (Greenpeace) into a greater understanding of the complexity of how the environment affects all systems. A change in environmental policy has been perceived to reflect an evolution from individualization to a collective responsibility.

Governments responded to environmental pressures and awareness in the 1970s with the creation of Environmental Departments whose first focus was to stop society from polluting the environment. Legislation was put in place for "end of pipe" limits of emissions on industry. Early research informed groups such as the Canadian Council of Ministers of Environment (CCME) to produce tables of limits or ranges of acceptable values of man made products in the environment.

Governance models have evolved with legislation over the past decades. Early legislation was decentralized and enabling. The Soil Conservation Act enabled local municipalities to assign their staff as conservation officers and make bylaws to control soil erosion. Responsibility transferred up to central government only if local control failed. Shared governance models are illustrated in the Water Act where local watershed boards could decide with central government on how policies would be implemented. Most recently the trend is to focus on managing growth as illustrated with the Climate Change Strategy or Land Use Framework.

Due to the origins of environmental policy, current policy focus is limited (e.g. EPEA). A more recent evolution is that of environmental cumulative effects. A cumulative effect approach recognizes that continuous exposure to low levels of pollution might be just as adverse as a single exposure to a high dose. A cumulative effects approach considers the whole system to managing the environment and considers the social, economic, health and environmental objectives. Under this new system non-point sources are evaluated for their contribution to cumulative objectives.

To design new policy to complement existing environmental policies and to move towards the next generation of environmental policy (cumulative effects) it is useful to review some of the current characteristics and thinking. These characteristics may help, hinder or both, in the development of new directions to achieve environmental outcomes through innovative methods including producer contributions to Ecosystem Services (ES).

#### Characteristics and thinking in regards to Environmental Policy

1. Environment policies have a short history – only a few decades.
2. Environment policies were initially created to deal with pollution that was found at point sources in the environment.
3. Environmental policies created limits to chemical toxins to protect human health and later, other species. Canadian Council of Ministers of the Environment set thresholds for compounds in the environment in the 1990s.
4. Environment departments had a protection and punishment philosophy. Markets and business capacity have not been a characteristic.

5. Much of the environmental policies and legislation are focused on single factor issues of the environment. E.g. nitrate levels, SOx levels, water levels, specific species. Systems have not been dealt with.
6. Anthropocentric (human-centered) perspectives and valuations are imposed on the environment. The environment is viewed and valued from a human perspective. For example, the Millennium Assessment report is titled “Ecosystems and Human Well Being” (Millennium Ecosystem Assessment, 2005).
7. Product Greening. Humans are selecting products that have perceived “greener” characteristics or traits. Consumers also expect more choices so differentiated products have become the norm for companies striving for more market share.
8. Far reaching voluntary regulations like EurepGAP<sup>3</sup>, GlobalGAP<sup>4</sup> have increased consumer awareness of environmental implications of food production.
9. There is an increased desire and ability to quantify the environment. In the past two decades a range of international and more local agencies have progressed in attempts to quantify the environment. E.g. OECD Environmental Indicators, Millennium Assessment, Ecosystem Status and Trends Reporting (Canada).

These characteristics and recent trends are shaping and influencing environmental policy development. A recent development that is acting as a catalyst for environmental policy development is the valuing of the goods and services we (humans) receive from nature otherwise known as Ecosystem Services. Developing markets for ES has been recognized as important to sustain our current population and economic growth. The table below identifies the current environmental trends in policy, governance and public opinion.

Table 2\_ Environmental traits in public policy, public thinking, and governance.

Environmental Trait or Trend	Constraints	Benefits
<i>A. Policies</i>		
Limits and thresholds focus on point source pollution	Based on human health thresholds. Ecosystems are buffers they take longer to respond to practice change	Creates a quantitative benchmark to compare achievements against.
Protection & punishment (Operational)	Society is conditioned to think punishment is only a consequence for not	Clear limits and consequences

<sup>3</sup> EurepGAP is a private sector body that sets voluntary standards for the certification of agricultural products around the globe.

<sup>4</sup> GLOBALGAP is a private sector body that sets voluntary standards for the certification of agricultural products around the globe.

	achieving goals.	
Alberta GHG system	Compels Industry to buy ES.	Allows a market to develop. Introduces a buyer (industry). Middlemen or aggregator model proven.
Agriculture is exempt from many Alberta Environment policies	Agriculture producers are not in-tune with environmental regulations like other industries (or like the agriculture processors and manufacturers).	Agriculture has been focusing on BMP which may be fundamental for the development of ES markets
Environment policy has been developed within the sector.	Developed without inclusion of agriculture industry.	A disciplined development towards a focused or specific policy.
Command & control	No encouragement for innovative approaches, systems approaches or thinking beyond the bounds of the policy. Producers, manufacturers are not partners but entities to be directed.	Clear indication of who decides and what is to be done.
<i>B. Public</i>		
Increased environmental awareness	Misperceptions do occur Demands that environmental issues be dealt with in same frame as other issues (health, education, etc).	More public interest and engagement.
Green product preference	Green desire may outweigh environmental sense. Buyers may demand certification.	Market has buyers familiar with product differentiation and labeling of environmental attributes.
Short term thinking	Buyers have no patience to wait for long term results.	Creates an opportunity to act fast
Alberta industries are creative, aggressive, risk takers	Could loose investment capital if technology or practice change is not support by the market	Will not be afraid of trying something new.
Corporate Social Responsibility, CSR is gaining popularity.	Could be costly to implement	Forces action by industry to act responsibly
<i>C. Government Structure</i>		
Develop & implement new policy quickly. Fix	Problems may not all be evident early on.	Policy appears quickly



the problems later.	Some damage may be long lasting.	
Persistence of silos within and across ministries.	Will last until executives are held accountable for them. Counter productive to integrative science and policy needs.	Narrower policy may fit ES more easily. Just have to measure or account for one factor.

The above table provides a broad overview of the current atmosphere of policy, public attitudes towards the environment and government operation. This is not a comprehensive list but rather highlights some of the benefits and constraints that may influence the development of ES markets.

There are a number of environmental principles and legislation that regulate the agricultural industry in Alberta. An overview of these policies and the challenges and opportunities they create is provided in appendix 2.

### Section Summary

- The environmental consciousness is growing and influencing societal decisions and public policy.
- A cumulative effects approach has emerged to consider the environmental system as opposed to past point source regulation.
- Developing markets for ES is emerging as an approach to manage the cumulative effects on the environment.
- ALSA will enable the establishment of markets for ES.

### **3.5 The Current Characteristics of Agriculture**

The agricultural industry is mature and has an established culture and social structure. The industry has been rapidly changing in recent years in response to increased global competition, expanding markets, city growth and industry reorganization to remain competitive, for example. These changes have influenced Alberta's agricultural industry. The changes experienced in Alberta are highlighted below:

- Cattle increased from 2.88 million to 6.37 million (ASRD, 2008).
- Hogs increased from 1.47 million to 2.05 million (ASRD, 2008).
- Areas of improved cropland increased from 25,296,177 to 32,160,765 acres (increase from 16 to 20% of the provincial land area)
- Farmers and ranchers are using about 1/3 of the Province's land
- Average size of land for production has increased 63%
- The Edmonton-Calgary corridor, Grand Prairie & Lethbridge, have been increasingly divided into parcels too small to farm or ranch

- Rural and urban growth has result in loss or conversion of some of the province's most productive farm and ranch lands to other uses
- Many corporate farms are owned by families
- There is an increasing focus on environmental issues (ie water quality, quantity and land use efficiency and carbon footprint)
- Many food corporations have a Social Responsibility Report Card (Agrivantage Report: Building Tomorrow Together, 2000).

There are other elements that influence the cultural and social dynamics of this industry. For instance, the largest group of farmers is aged 45 to 64; many producers see agriculture as a lifestyle and a way of life which influences business decisions. Financial resources also continue to be an issue. The table below provides a description of the four segments of the agricultural industry in Alberta based on producer type. The table also highlights the characteristics of each segment group that would contribute to the adoption of a new business model (table 3).

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Table 3. Description of Alberta producers and likeliness to adopt new practices and technology (Ipsos Forward Research, 2008)

## **Alberta Producer Groups**

### ***CASUAL/SMALL OPERATOR (33%)***

#### ***Characteristics***

- farming is a way of life
- the largest of the four producer groups
- low farm income
- most income off farm,

#### ***Opportunities/Challenges for adoption of new business model***

- look for off-farm employment to stabilize farm income
- not likely to adapt to new technology and practices
- least likely to reinvest in farm operation
- likely to be the sole owners of their agriculture operation

### ***BOARDERLINE COMMERCIAL (24%)***

#### ***Characteristics***

- makes up about one-quarter of producers
- below average farm sales
- highest proportion of older producers
- struggle financially

#### ***Opportunities/Challenges for adoption of new business model***

- don't view themselves as innovators or leaders
- access to capital and farm input costs are main threats to the farm
- likely to be sole owner of operation

### ***TRADITIONAL (24%)***

#### ***Characteristics***

- accounts for about one-quarter of the producers in Alberta
- viable operations with above averages sales and size
- most income comes from farm, maintaining and expanding operation,
- operation is both business and lifestyle, high number of family farms,

#### ***Opportunities/Challenges for adoption of new business model***

- consider environmental stewardship to be an issue or threat to their operation
- support local business
- most likely to reinvest in operation
- they focus on quality production rather than quantity

### ***PROGRESSIVE COMMERCIAL (19%)***

#### ***Characteristics***

- the smallest and about one-fifth of producers in Alberta
- commercial business oriented
- successful and expanding,
- small part of income is made off-farm
- younger
- new farm methods, perceived as leaders
- others ask for advice, most involved in boards and commissions,

#### ***Opportunities/Challenges for adoption of new business model***

- most likely to pursue new technology and innovation

Furthermore, the results produced by the Alberta Agricultural Producers Marketing Council (AAPMC) 2008 Producer Survey indicates that there are three groups who would most likely adopt new practices and technology (Progressive Commercial, Traditional, and Borderline Commercial). Alberta producers have identified that over the next five years the major threats to operations are the cost of farm inputs, restricted markets access and government regulations.

The agriculture industry also has a long, rich history in Alberta. The industry has contributed to the provincial culture, politics, and social structures. Other cultural traits have recently emerged due to the extent of unprecedented growth in the province and the movement of the general population from the farm or rural mosaic to cities (Ipsos Forward Research, 2008). Tensions are increasing between agriculture producers and cities due to city encroachment on agricultural land and small producers being pushed out of agriculture from the industrialization of the agricultural industry (Ipsos Forward Research, 2008). These issues are just a few that have contributed to the growing *us against them* position among agricultural producers.

Alberta producers were asked to comment on their actions in regards to environmental farm practices on their farms. Alberta producers were found to be most in agreement with the following statements:

- I am confident that I am doing everything reasonably possible to protect the water quality on my farm
- I am doing everything I reasonably can to control soil erosion on my farm
- I consider preservation of streams, rivers and wetlands and their riparian margins as an essential part of an environmentally sustainable agricultural land base
- I consider wildlife on my farm to be an indication of a healthy environment

Other highlights from this research include the agricultural industries agreement that the conservation practices they implement have a positive impact on the overall environment. In addition, this industry group is ready to adopt more practices that enhance and conserve the environment.

The Environmentally Sustainable Agriculture Tracking Survey Report categorized the Agricultural Industry into three main groups Cluster 1, Cluster 2 and Cluster 3.

*Cluster 1 represents producers that value the environment and want to see it protected. They express concern with risks to human and animal health. Many from this group believe that governments have a role to address environmental issues in agriculture and should be involved. Cluster 1 also expressed a responsibility to mitigate their impact on the environment. They expressed that ESA contributed to the financial viability of their farm from the environmental practices they implement. Cluster 1 producers generally operate in the Peace Region with a smaller proportion in the South. Cluster 1 producers tend to have more livestock-only producers and fewer mixed.*

*Cluster 2 attitudes varied the most when it came to environmental sustainable practices. They believe that ESA practices are not financially viable and would require a financial incentive to implement more of these practices. They understand that society benefits from the practices they implement and so should pay the bill. They believe that the*

*conservation practices they implement do not have an impact on the environment. Many feel that research into environmentally friendly farming practices is not needed and did not support the introduction of government regulation even though they believe society should pay for the environmental benefits from their farming practices. Of the three Cluster groups they have the lowest adoption score for ESA practices. A majority of this cluster is located in the Southern region with the fewest in the Peace. This cluster had the fewest livestock producers. This group sees environment as a cost of doing business. They do not believe that the environmental initiatives they implement make a positive impact on the environment.*

*The final Cluster group 3 expressed less concern and interest towards environmental farm issues. This Cluster did not find adopting and learning about conservation farm practices to be beneficial. They were not overly concerned with the risks associated with using crop protection products or the impact of soil erosion. This group does not value wildlife, natural resources and unbroken land to the same degree as Cluster 1. They do not want to see government involvement like Cluster 2 but feel indifferent towards society paying their environmental sustainability bills. They disagree that adopting environmental practices contributes to the profitability of their farms. Cluster 3 represents the fewest smallest farms with most representation from mature farm operations. This groups many not be overly concerned with the environment but this may be due to a lack of awareness.*

Overall, this study showed the difference in attitudes among Alberta producers towards environmental sustainability. An emerging major trend is that even though many farmers do not practice ESA the general adoption rate of these methods is increasing. Farmers are also interested in learning about ESA. Furthermore, information around the economic benefits from implementing conservation practices is another key aspect that influences the chance that ESA practices will be adopted. The chance of adoption of ESA depends on attitudes of the agricultural producer towards the environment. Some practice ESA methods because they value the environment and others do not see the value of practicing ESA and believe society should pay for this service. Adoption of ESA by these Alberta producers may require a combination of financial incentives, regulation and markets or a definite improvement to their bottom line.

The agriculture sector is transforming, operations are larger and commercial yet some still farm because it is a way of life. Farm incomes are often supplemented by off farm income and government subsidies. Farmers are also finding themselves to be in more conflict with urban areas. This is creating problems between agricultural producers and urbanites and contributing to the *us against them* mentality. There is also a general trend in society towards conserving and enhancing the environment and this trend is also true in the agricultural industry. Many Agricultural Producers are adopting ESA practices, however, there is a large number who have not adopted because they do not see the value or require financial capital to change. Financial capital is an issue for the agricultural industry in Alberta. Many Alberta producers sustain their business with other forms of income or are considering giving up farming because it is no longer viable.

### Section Summary

- Alberta producers are generally forward thinking- they focus on the long term welfare and condition of their land.
- Alberta producers face financial challenges, with a significant portion struggling to maintain financial viability of their operation.
- There is an increasing fragmentation on the landscape from development that is influencing the operation of agricultural producers.
- Social and cultural drivers are generally not discussed nor documented, however they are necessary to understand how the industry can transformation

### **3.6 The Current State of Agriculture Governance**

Alberta's agricultural industry governance structure is organized into commodity associations. Legislation such as the Marketing of Agricultural Products Act (MAPA) influences the work of Alberta's agricultural boards and commissions. The current structure is perceived as a barrier to facilitating change and addressing complex problems. For example, as identified in the Agrivantage Report: Building Tomorrow Together, 2000 government structure and capacity has been identified as an issue for the agricultural industry. Alberta has maintained its traditional structure while other provinces such as Ontario have advanced and modernized. The structure creates challenges for the industry to reorganize and become more competitive in the emerging market system. Some of the key challenges in the governance of the agricultural industry are:

- The role of governance depends on the commodity. Producers have different degrees of opportunities for governance and market participation depending on their commodity association.
- Some commodity producers fall under the governance of multiple boards. For example, wheat producers in Alberta are subject to the rules of a provincial and federal commodity association.
- Agricultural producers do not have strong working relationships with government
- One tenth of Alberta producers state that they are currently actively involved with an Alberta Board/Commission. The majority (69%) have never been actively involved, while less than one-fifth used to be actively involved but are no longer.
- Lack of time or resources is the main reason for producers not being involved in Alberta boards/commissions. It does not appear that activity in boards will increase with about 86% saying that they are unlikely to be involved in the next 3 years (Ipsos Forward Research, 2008).
- Contributions to Alberta Boards/Commissions vary by producer segment and farm sales. The services or programs that were most frequently mentioned as benefitting producers are market development, product promotion and communication with producer members. The main roles that Alberta Boards/Commissions are seen to be performing today is representing the producers (16%) as well as finding and developing new markets and market promotion (14%) (Ipsos Forward Research, 2008).

To ensure effective governance to remain competitive in the emerging market system the following changes have been suggested:

- Promote alignment of industry organizations towards outcome, goals or function (environment, social, research, specific policy etc.).

- Enable industry organizations to adopt a competency-based approach to board governance and have broader participation along the supply chain.
- Develop leadership that facilitates transition of the industry nationally (Alberta Meat and Livestock Agency, 2008).

#### Section Summary

- The current governance structure does not easily facilitate Alberta producers to work collaboratively towards a common interest.

## **4. The Future State of Alberta's Agriculture Industry**

Alberta's Agriculture Producers are used to adapting to changing conditions. Agriculture producers in this Province have dealt with adverse weather conditions such as drought and adverse weather conditions. However, the problems facing the industry today are more complex and deal with a variety of factors that are dynamic. The Alberta Agriculture industry is facing public pressure to ensure operations meet environmental and social objectives while having to manage the rising costs of inputs to farm operations and remain competitive on the global market.

### **4.1. Land Use Framework and the Alberta Land Stewardship Act (ALSA)**

The Land-use Framework is meant to be a comprehensive approach to planning to better manage public and private lands and natural resources to achieve Alberta's long-term economic, environmental and social goals.

ALSA was passed in the spring 2009 session of the Alberta Legislature receiving Royal Assent on June 4, 2009. The law was proclaimed October 1, 2009. ALSA creates the authority for a set of regional plans within each of the seven regions identified in the Land-use Framework. There are 25 acts, including the *Agricultural Operation Practices Act*, amended by *The Alberta Land Stewardship Act (ALSA)* (Appendix B).

Many of these acts have components that are applicable to agriculture in Alberta and these components may also see change through the upcoming amendments (Appendix B). Four conservation and stewardship tools are defined in the Act to help protect specific landscapes, views, apexes, and lands of ecological or heritage value. The tools are conservation easements, conservation offsets, conservation directives and transfer of development credits.

The recently passed Alberta Land Stewardship Act (ALSA) enables expanded use of conservation easements and the use of conservation directives, conservation offsets and transfer of development credits. ALSA will enable the use of market-based instruments to meet environmental objectives. The intent is to more closely align conservation efforts with land-use planning efforts in the province and to reduce the fragmentation and conversion of agricultural land to other uses. Each policy tool will come with a set of regulations and require financial capacity to implement. Below the tools enabled and further supported by the ALSA are listed

- 1) Conservation easements

- A conservation easement is a voluntary legal agreement between a landowner and a qualified organization, such as a land trust or government, to conserve the ecological integrity of a piece of land. The easement is registered on the land title, but landowners retain ownership of the land.
- Conservation easements have been in place in Alberta for over 10 years. Currently, around 300 square kilometres, or 0.2 per cent, of Alberta's private lands are under conservation easements.
- The legislative provisions are being moved from the *Environmental Protection and Enhancement Act* and expanded through *ALSA* to also be used to conserve agricultural land.

## 2) Conservation offsets

- Offsets counterbalance the effects of an activity on both public and private land. They can be used to replace, restore or compensate for affected landscapes. For example, a company can conserve an environmentally significant area to offset its industrial activity elsewhere.
- Existing environmental standards or regulatory requirements remain in effect.
- *ALSA* sets the framework for offsets to be used for restoration, mitigation or conservation. It provides a legal basis for the government to establish an offset program and to set rules for defining and trading offsets.

## 3) Conservation directives

- *ALSA* enables the use of a new tool, the conservation directive, to conserve valued landscapes, ecologically sensitive areas and scenic landscapes.
- Regional plans may expressly set aside specific areas to protect, conserve and enhance land with environmental, scenic or aesthetic values or agricultural land.
- The Alberta government will compensate owners of these lands for any decrease in the market value of their land. The principles for deciding on compensation payable are drawn from the *Expropriation Act*.

## 4) Transfer of development credits (TDCs)

- TDCs help direct development away from specific areas needed to conserve ecologically sensitive, scenic, historical or agricultural areas.
- Land-use plans (regional, sub-regional or municipal) may allow the use of TDCs. Plans and may designate the areas to be conserved and areas to be developed.
- TDCs have the potential to address issues such as urban and rural growth pressures and loss of agricultural land and ecological or heritage landscapes.

## 5) Conservation exchange

- A conservation exchange supports, verifies and tracks the use of market-based conservation and stewardship instruments such as conservation offsets or transfer of development credits.
- *ALSA* provides a legal foundation for the creation of an exchange in Alberta.



- The activities of the exchange could include:
  - facilitating the purchase and sale of offsets or credits;
  - registering and tracking trades in offsets or credits;
  - providing authentication of offsets or credits;
  - providing information on a range of market-based instruments; and
  - reporting on results from the use of these instruments.

## **5. Conclusion (paths to the new system)**

The current structure of the agricultural industry is not in a position to take advantage of emerging environmental opportunities or to meet environmental challenges. This report highlights that the industry will have to evolve to take advantage of the emerging opportunities. The industry will likely face challenges with moving the costs associated with achieving objectives such as clean water and air to the asset side of their business equation. Challenges are also identified in agriculture policy regarding the implementation of policies that create perverse outcomes. These will have to be addressed. However, emerging environmental policy is showing that it is no longer acceptable to continue with a business as usual approach. Society is more conscious of the environmental impacts from industry and emerging legislation is a reflection of this. Legislation such as the ALSA sets the foundation for the development of markets for ES in Alberta. Yet, the industry is facing many challenges. The scale of production is increasing, a large majority of agricultural producers represent an aging population, producers are facing financial problems, and generally there is a growing urban population that is encroaching on agriculture lands. Despite the challenges the industry may be able to evolve to take advantage of emerging markets. Opportunities do exist for agricultural producers to capitalize on new markets.

### **5.1 Agriculture Producer Stakeholder Recommendations**

#### **Ecosystem Services Markets**

- Need to be clear on how the price for ES is set – what is the value for the services, and how is this value determined.
- ES bundle themselves naturally (i.e. riparian provides water quality and biodiversity), need to consider the ES package that gets you your biggest bang for your buck, much of the value is in the bundling
- Transaction costs must be as low as possible. Concerns with aggregators. Reduce the middlemen transactions because they take money away from the producers (the middlemen are getting more financial returns than the producers who are producing them i.e. carbon market)
- There is some concern that producers who are already providing ES may miss out on the opportunity. Additional rewards may be needed for those who are already providing ES. (i.e. a system where credits could be granted going back a certain number of years and a banked return on that investment)- benchmark and baselines are important.
- Needs to have higher value – can not be targeted at the bottom performers.
- Scale is an issue/ size of the market
- Develop simple market transactions to encourage participation

- Need to establish the ES products before you create the demand (or develop the market) Need to prioritize the ES that can be enhanced through a market. Understanding the product will be important to producers in order to participate in the market.
- Be clear on the rules, standards, quality assurance of the market
- Sort through who participates – land owner or land operator (KEY)
- Market place should have a variety of market mechanisms to choose from – caution on the unintended consequence of “cherry picking” winners, that leave little value for majority of the industry
- Market needs to be coordinated, simple and streamlined
- Is there a role for market speculators
- Need to consider the agriculture industry as a whole – both buyers and sellers,
- They want to see the demand for the ecosystem service they are providing.
- Baseline and benchmark is needed. There is no identified amount of ES that qualifies as contributing to biodiversity for example. This information is necessary for producers to know so that they can market (sell) the ES they have on their land.
- Our current knowledge of ES is limited so establishing a tiered credit system where producers could get credit for the level of ES they provide and gradually increase this supply over time to take advantage of other tiered levels would help engage producers early on in the market system. This would also provide incentives to engage producers at the onset of the market.

### **ES Policy and Regulation**

- What happens when the operator provides one or two ES, but does not meet other regulations? Do you need to take a whole farm approach and reconcile the economic benefits with overall poor operation score card. Is there a need for some cross-compliance mechanism to set some minimum bar? - The Conservation Security Program is more of a direct annual payment to the best 10% of producers in a watershed and they compete for that. That reward is based on a total farm assessment and scoring system so the best environmental managers are rewarded.
- Concerns with past policy and programs that have “run out of funding” – need to ensure policy is long term and ensures payment if you go through the steps to provide the ES.
- Regulation is hurting the industry- is this going to be an additional regulation to an industry that is already uncompetitive. Need to reduce the cost of compliance.
- Be aware that if a policy imposes a cost or limit on one part of the industry (fertilizer company) it's often the producer that pays for it in their input costs. Need to consider how the agriculture industry is connected.
- Not all policy, markets, programs will fit all situations.

### **ES market information and outreach**

- Messaging is important for selling the tool/market to producers – Good information regarding the market – where is the ES, what is the value, how do the producers participate, rules of the market, market speculation
- Use of language could influence people's perceptions of ES markets. For example, the use of the term additional is viewed as referring to additional regulation
- Industry to industry messaging will be important for market trust
- Knowledge of ES is essential to understand what the outcomes could be
- Might want to consider how examples today can be scaled up

- See the environment as a cost but recognize that the opportunity is there to take advantage of these emerging markets. The problem is getting producers from where they are now to the point where they can participate in the market
- Implementation must have education. This education would be successful if implemented through the boards and commissions as they already have established trust with producers. It would also be the quickest as opposed to setting up new entities.
- Knowing the ES is important and is missing. We need this information to set the benchmark. We also need this information to decide what and where we can improve the ES that is on the landscape

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## **Appendix A**

Agriculture and Agri-Food Canada is responsible for a number of Acts related to agriculture and food in Canada.

Agricultural Marketing Programs Act  
Agricultural Products Marketing Act  
Animal Pedigree Act

Canada Grain Act  
Canadian Dairy Commission Act  
Canadian Wheat Board Act  
Department of Agriculture and Agri-Food Act  
Experimental Farm Stations Act  
Farm Debt Mediation Act  
Farm Credit Canada Act  
Farm Improvement Loans Act  
Farm Improvement and Marketing Cooperatives Loans Act  
Farm Income Protection Act  
Farm Products Agencies Act  
Prairie Farm Rehabilitation Act

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## **Appendix B**

### **Legislation amended by The Alberta Land Stewardship Act.**

*Administrative Penalties and Related Matters Statutes Amendment Act 2002*  
*Agricultural Operation Practices Act*  
*Agricultural Pests Act*  
*Alberta Utilities Commission Act*  
*Coal Conservation Act*  
*Electric Utilities Act*  
*Energy Resources Conservation Act*  
*Environmental Protection and Enhancement Act*  
*Forests Act*  
*Highways Development and Protection Act*  
*Historical Resources Act*  
*Interpretation Act*  
*Irrigation Districts Act*  
*Mines and Minerals Act*  
*Municipal Government Act*  
*Natural Resources Conservation Board Act*  
*Oil and Gas Conservation Act*  
*Oil Sands Conservation Act*  
*Pipeline Act*  
*Post-secondary Learning Act*  
*Provincial Parks Act*  
*Public Highways Development Act*  
*Public Lands Act*  
*Water Act*  
*Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangeland Act*  
*Wildlife Act*