

ALBERTA LAND INSTITUTE

FRAGMENTATION AND CONVERSION OF AGRICULTURAL LAND - ANALYSIS OF VALUES TO INFORM POLICY

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Abstract

Through the Land Use Framework and Municipal Government Act, Alberta has effectively devolved responsibility for land use planning and farmland conservation to municipal governments. Provincial legislation identifies several policy tools for use by municipalities, including conservation easements, but provides little guidance on how the tools can be applied. The primary policy tool remains the Municipal Development Plans of individual municipalities and adherence to those plans through the decisions that municipal councils continually make to approve or deny applications to re-zone or re-designate land from agriculture to other uses.

In that context, this project sought to assess three questions:

1. What would be the cost of using market-based policy instruments to protect land in agriculture? How would that cost vary in different parts of the province?
2. Do municipal government policies toward development or conservation of open space make a difference in property values and property taxes?
3. What are the attitudes and perceptions of experts, municipal government employees and municipal councillors toward preservation and conversion of agricultural land?

Results regarding the first question show that across Alberta, only about 46% of the asking price of rural properties is related to the productive agricultural value of the land, 15% of the value is due to its residential and recreational value, and nearly 40% is the value of the option to convert the land into residential or industrial uses in the future. The value of development potential varies tremendously across the province, near 0 in some municipal districts, and nearly \$50,000 per acre in areas immediately adjacent to urban fringe areas on the south side of Edmonton. Even within the Edmonton Metropolitan region, there is large variation in the value of future conversion. These results indicate the difficulties that new farmers have to finance agricultural land purchase and the potential to use market-based instruments in some specific locations.

A case study of the Town of Okotoks produced answers to the second question. Using a hedonic price approach, the study found that home owners in Okotoks were willing to pay more for homes located within 200 meters of open space, particularly forests. The results also show that the shift from a finite growth policy that conserved forests and other open space to a continuous growth policy caused significant reductions in home values. Tax revenue generated by those homes would have been reduced as a result.

Answers to the third question were generated through qualitative research. Semi open-ended interviews were conducted with 46 key stakeholders, yielding new insights into the complex decision making of municipal officials. Some elected officials feel obliged to comply with a historical pro-growth policy, others feel more compelled to weigh-off the social benefits and private costs of conservation of agricultural land. Concerns about security of property rights, fairness and inter-municipal competition for development are at the core of municipal decision making.



A Statement on the Approach/Methodology

The balance between agricultural land preservation and development is often at the heart of polarizing regional planning conflicts in Canada, particularly in areas at the urban-rural margin. In Alberta, with Canada's fastest growing provincial population, no comprehensive provincial-level public policy has yet been put in place to address the issue of agricultural land conversion and fragmentation. This continues, despite widespread public concern about loss of prime farmland and the unsustainability of sprawling patterns of development.

A previous research project of the Alberta Land Institute, "*The Economics of Fragmentation and Conversion of Agricultural Land*" produced important new insights into the magnitude, spatial distribution, and causal factors affecting the fragmentation and conversion of land from agriculture to developed land uses (mostly industry and residential). Studies were conducted for the province as a whole, for the corridor area around and between Calgary and Edmonton, and for the Edmonton Metropolitan Region. Survey research was also conducted regarding the attitudes of residents of the Edmonton Metropolitan Region regarding land use conversion and their willingness to pay to conserve land in agriculture. That project also highlighted the comparatively large role that municipal governments play regarding land use in Alberta. Alberta's provincial land use framework and Municipal Government Act indicate concern for the preservation of prime farm land, but devolve most responsibility for land use to municipalities.

The current project was guided by a project advisory committee that included representatives from Alberta Professional Planners Institute, the Canadian Institute of Planners, the Edmonton Municipal Region Board (formerly Capital Region Board), the Calgary Regional Partnership, Alberta Agriculture and Rural Development, the Alberta Association of Urban Municipalities, and the Alberta Association of Municipal Districts and Counties. Three professors and five graduate students were involved.

Four specific studies were undertaken, all of which were designed to better inform public policies regarding agricultural land conservation and development. First, the potential costs of market-based approaches to farmland conservation, perhaps using conservation easements to compensate land owners for foregone development, were considered through an analysis of the values of rural real estate across Alberta. A hedonic price model was estimated and used to decompose rural real estate prices into agricultural production value, rural residential value, and option value for future conversion into residential or industrial uses.

Second, a natural experiment of a shift in policy for an Albertan urban municipality from constrained growth and preservation of open space to more rapid and permissive growth was evaluated for the Town of Okotoks, near the City of Calgary. A policy change in 2012 was assessed to estimate residents' willingness to pay for living near different types of open space, as well as the effects of policies that provide different levels of assurance of open space in the future, as reflected in property values. Spatially explicit hedonic price modelling was used in this study. This analysis was facilitated by access to a large database of property values provided pro bona by Brookfield RPS.



Third, qualitative methods were used to identify the key issues of concern to the general public and municipal leaders in particular. Using Alberta communities as case studies, in order to inform balanced land-use policies that consider social, environmental and economic issues. This study involved municipal document review and 49 semi-structured interviews with elected officials (16), municipal administration members (13), farmers (8), advocates for land protection (8), and developers (4). While interviews and research into financial land values were carried out in a number of areas of the province, three case areas were highlighted for intensive research, including the Parkland County area west of Edmonton, Grande Prairie County area, and areas surrounding the City of Calgary (including Rocky View County, Wheatland County, the Municipal District of Foothills, and the Town of Okotoks).

The fourth study provides a rigorous assessment and analysis of the attitudes of Alberta residents toward farmland conservation and development. Research methods included anonymous focus groups in Edmonton and Lethbridge, pre-testing of an online survey, and an on line survey of 1303 residents of the six largest urban centres in Alberta: Calgary, Edmonton, Lethbridge, Red Deer, Medicine Hat, and Grand Prairie. Respondents from each area were asked to comment on the recent development trend in their area. Half of the survey respondents were asked questions regarding their willingness to pay to conserve more farmland than would otherwise occur, the other half were asked questions regarding their willingness to accept compensation for allowing additional areas to be developed beyond existing urban boundaries.



Research Summary

Study 1: Decomposing the values of Alberta's rural properties

Preserving land in agricultural uses entails benefits and costs. Benefits include the values of ecosystem goods and services associated with agricultural land uses, while costs include the foregone revenues from alternative land uses such as industry or residence. In order to estimate the value of foregone land uses, we undertook an analysis that decomposed the values of rural properties into agricultural values, residential values, and the value of development potential. The analysis was based on advertised prices for 611 parcels of farm real estate gleaned from internet sites, including Kijiji, in 2014 and 2015. All of these parcels included farm buildings and thus should be considered as multiple use rural properties.

Using a spatial error approach to account for the spatial dependence of farmland prices, we found significant statistical relationships between rural property prices and features of the farms, the subdivision status of the land, the quality of the housing, as well as several spatial characteristics associated with potential to be converted into residential or industrial uses. We then applied a formula to decompose the price of farm real estate into conversion option value, residential value, recreation value, and agricultural value. Conversion option value was then interpolated for most of the province's "white zone" where land is privately held, through the co-kriging method.

Results - Study 1

1. There were insufficient properties advertised in the area around Calgary to estimate the statistical model. Apparently, purchase agreements are very common in the Calgary area.
2. Agricultural value comprised an average of 46% of farmland value.
3. Recreation and residential value comprised an average of 15% of farmland value.
4. Value of conversion option -the value of the potential to convert land from agricultural to non-agricultural uses -comprised an average of 39% of farmland value.
5. The value of conversion option ranged from near \$0 / acre in parts of Provost and Wainwright Municipal Districts near the Saskatchewan border to as high as \$50,000 per acre in the City of Edmonton and adjacent parts of Strathcona and Leduc County.
6. Even within the Edmonton Metropolitan Region there are large differences in the value of conversion option, ranging from less than \$1,000 / acre in western parts of Parkland County to over \$50,000 / acre in parts of Leduc County. In other words, purchase of conservation easements as a tool to retain land in agriculture could range from less than \$20,000 per quarter section in some parts of the province to as high as \$6.8 million per quarter section in the areas of highest development pressure around Edmonton.
7. The main limitation of study 1 was that the advertised prices for 2014-15 may have been considerably higher than the actual sales prices. This effect may have been mitigated by the overall upward trend of farmland prices in Alberta, with prices in 2018 nearly double what they were in 2013 (Farm Credit Canada).



Study 2: The Effects of Land-Use Policy in People's Willingness to Pay for Open Space - the case of Okotoks, Alberta

Studies conducted across North America show that people value living in close proximity to open space as it provides us with amenities including scenic views, recreational experience, agricultural products, and soil conservation. Previous studies in the United States have found that, all else equal, people are willing to pay more for houses located near to croplands, grassland, parks, wetlands and marshlands. However, land use regulations and policies which aim to accommodate the rapid growth of cities could potentially affect the probability of open space conversion in the near future. When people receive that information and change their expectations on the future of nearby open space, their willingness-to-pay for living near different types of open space may also be altered. Policies that constrain or facilitate expansion of development into open space may thus have effects on real estate prices, which in turn may influence property tax income earned by local governments. This issue may be particularly acute in Alberta. Previous ALI studies found that the conversion of high-quality farmlands made up of 72% of the new developed area around and between Edmonton and Calgary.

The Town of Okotoks, south of the City of Calgary, represents an interesting natural experiment to assess the values of open space on urban property values, as well as the effect of a policy shift on those values. In 1998, Okotoks adopted a 20-year Municipal Development Plan that gave priority to preservation of environmentally significant lands and maintenance of a healthy urban forest. This 'finite growth policy' was replaced in 2012 by a 'continuous growth policy' that envisages steady growth and expansion of the town boundaries into nearby parts of the Municipal District of Foothills. In this context we undertook a hedonic price analysis of the values of open space in the Town of Okotoks, and the effects of the 2012 policy change on those values. For this study we had access to a rich data base of 1,185 geo-referenced real estate transactions for single family houses from Brookfield RPS. The data covered by period 2010-2017. We used those data, with data from a variety of other sources to estimate a hedonic price model for Okotoks housing prices. We used an endogenous switching regression approach to account for the fact that people's likelihood to sell their house may have also been affected by the policy change.

Results - Study 2

1. Average housing prices increased from \$477,541 to \$516,548 before and after 2012, expressed in 2016 Canadian dollars.
2. Open space located further than 200 meters from a residential property has no effect on the value of that property.
3. We found no effect of proximity to cropland on nearby housing prices.
4. Close proximity to forest land, pasture land, and grassland all had significant positive effects on housing prices before and after the policy change in 2012.
5. Willingness to pay for an extra acre of open space within 200 meters of a property was greatest for forest land, pasture land and grassland, in that order. Before the policy change, an additional acre of open space within 200 meters added the following amounts to housing prices: 9.2% for forest, 5.0% for pasture land, and 1.9% for grassland.



6. Willingness to pay for all types of open space was significantly lower after the 2012 policy change than before. Willingness to pay reduced by 35% for forest land, 25% for pasture land, and by 38% for grassland.
7. Overall we estimate that the average properties located within 200 meters of open space decreased in value by \$21,995 as a result of the 2012 policy change in Okotoks. All else equal, this will have reduced the tax revenue collected by the Okotoks town council for those properties.



Study 3. Attitudes and social values toward development and conservation of agricultural land in Alberta

The Municipal Government Act (MGA) grants jurisdiction over land use decisions on private lands to municipal governments. This gives municipal governments the power to protect agricultural land from both fragmentation and conversion through the ability to reject applications for rezoning of agricultural land to other uses. In 2009, the provincial government enacted the Alberta Land Stewardship Act (ALSA) which established additional tools for agricultural land protection (conservation easements, conservation offsets, conservation directives and transfer of development credits). However, these tools have had very limited application in Alberta at present leaving the acceptance or rejection of subdivision and/or rezoning applications as the principal approach to preventing land use fragmentation and conversion in the province.

Provincial direction on agricultural land use protection is outlined in the 1996 Municipal Affairs publication Land Use Policies which "encourages" municipalities to identify where agricultural land should be a primary land use, to limit fragmentation of agricultural land, to direct non-agricultural uses of land to areas where development will not constrain agricultural activities, and to minimize conflicts between agricultural land and other uses. Recent changes to the MGA require all municipalities to include policies respecting the protection of agricultural operations into their Municipal Development Plan (MOP). All municipalities are also required to develop Intermunicipal Development Plans (IDP) as a means to coordinate land use and service planning between municipalities that share a municipal boundary.

While MDPs and IDPs outline municipal ambitions regarding future land use, each municipality's Land Use Bylaw (LUB) enshrines the legal limitations as to what uses are permitted on different parcels of land. Municipal regulations on subdivision outline how parcels of land can be subdivided into smaller parcels. Most municipalities have land zoned (designated) as agricultural land which has a very narrow set of uses. To develop these parcels of land (into residential, commercial, or industrial) a change in land use, or 'rezoning' must take place. This can be a municipally initiated rezoning or an application for rezoning by a landowner. A similar process is required for land subdivision. Municipal councils have the final say as to whether a rezoning and/or subdivision application is approved.

This research explored factors affecting municipal decision making with regards to land use decisions affecting existing agricultural land. The focus of much of the research was on how local social and cultural values affected the decisions of municipal councils. This work reflects the recognition that formal systems of governance (such as zoning) work within a cultural and social milieu that affect the functioning of the formal system. Understanding the interactions between the formal and informal institutions is necessary to develop effective policy changes moving forwards. The study involved a review of municipal government documents and 49 semi-structured interviews with elected officials (16), municipal administration members (13), farmers (8), advocates for land protection (8), and developers (4).



Results - Study 3

1. Interviewees identified a number of factors that influenced council decisions regarding the fragmentation and conversion of agricultural land. Many of these factors were anticipated, such as an awareness of the agricultural land quality of sites, the proximity to existing development, the impacts of the specific use being proposed, and the nature of the fragmentation.
2. Many elected officials held personal values regarding property rights that differed from the legal property rights actually held by individuals. Many suggested that they, and a large proportion of their constituents, felt that property owners should have the right to develop their property as they see fit without interference from the municipal (or provincial) government. This belief was rooted in a long-term practice of permissive rezoning and subdivision in many areas and a general expectation that a rezoning was only a formality of an assured process. These beliefs were also related to general attitudes regarding the role of markets and government that could be characterized as a 'free market' orientation. Such beliefs were generally in conflict with the views of land use planning professionals in the administrations of communities who consider the 'right' to develop farmland as a privilege that can be granted by municipalities if it is in the public interest to do so. Some respondents indicated that expectations had been starting to change with land owners becoming increasingly aware of some of the limitations on land development.
3. A large majority of elected officials voiced concerns over being "fair" to landowners and 'being wrong' in rejecting applications for a rezoning and/or subdivision. In each case coming before a municipal council, the council members must weigh the benefits to the individual land owner against the benefits and costs to their municipality and to society as a whole. The preservation of agricultural land was seen as something that primarily benefits society as a whole (food production, avoidance of habitat encroachment, etc.) and the municipality (local agricultural production, agricultural aesthetic, etc.). Factors such as the quality and location of the land must be weighed against the loss of development potential (and thus profit) for the land owner. Respondents indicated that if they approved a rezoning that they should not have (based upon an objective assessment of the above), the overall impact was small on society as it was only a single parcel or area of land against all of the land in the municipality (or province or world indeed). However, if they rejected a rezoning on an application and were incorrect in that judgement, the impact of that error was felt entirely by the applicant, often a long-term member of the community who was hoping to retire or to pass the proceeds of their land to their children and grandchildren.
4. A number of elected officials indicated that they felt more of an obligation to support applications from long time members of the community than to support those submitted by someone who had only recently purchased the land. Note that legally, the length of tenure has no bearing on development rights or the ability to rezone land.
5. Concerns over fairness were further amplified by a lack of confidence in the existing measures of agricultural land quality. Such measures were often seen as coarse generalizations of land with local variations. Some respondents indicated that applicants seeking to subdivide off part of their farm who have farmed the land for a substantial amount of time would know which land should and shouldn't be made available for other uses and thus they should be deferred to with regards to consideration of what land should be subdivided and developed for non-agricultural purposes. This uncertainty over land quality fed into the issue of not wanting to be wrong mentioned above.



6. Relationships with surrounding municipalities and their land use decision making was noted as a factor influencing land use decisions. In many cases, members of local administrations and elected officials expressed concerns that any effort to restrict land development in their municipality would be countered by permissive decisions being made by municipalities that they shared a border with. There were particular tensions between urban and rural municipalities with many respondents in rural municipalities indicating a mistrust of the motives of urban municipalities seeking to protect land along their boundaries. There was a concern that they were doing so with future annexations in mind. Note that this research took place prior to the requirement for comprehensive Inter-Municipal Development Plans dealing with land use.
7. The final key finding related to the breakdown of provincial and municipal responsibilities for protecting agricultural land. Some respondents (both elected officials and members of municipal administrations) indicated that the relatively weak statements by the province that 'encourage' good planning with regards to agricultural land created a difficulty. In the face of strong pro-development path dependence, enacting more restrictive decision making on agricultural land was challenging as there was no provincial backstop to defend decisions to not allow rezoning or subdivision of agricultural land. Some respondents wished that a stronger provincial directive existed. With that noted, many also noted that the province should not seek to become involved in the land use decision making process.



Study 4. Survey of Alberta residents' attitudes toward farmland conservation and development

A previous phase of this project included a survey of 320 residents of the Edmonton Metropolitan Region. That survey provided insights into attitudes toward farmland conservation and development, as well as people's willingness to contribute funds toward farmland preservation in the area. That study provided several important insights, but left some questions unanswered. First, how stable are people's attitudes toward farmland conservation in the Edmonton Metropolitan Region? Has the economic downturn changed people's attitudes toward conservation and development? Second, how similar are people's attitudes toward conservation in different parts of Alberta? Is there a different narrative in the Calgary area? What about smaller cities in the province? Third, given that landowners do not necessarily have the right to convert land into developed uses, how would urban residents respond to questions that presume that they have the right to live near to open space?

A major new survey was thus planned in 2018 and implemented in February and March of 2019. Two versions of the survey questionnaire were developed, one which explores willingness to pay for additional farmland conservation, the other which explores willingness to accept compensation in order to allow for additional farmland conversion. An Alberta survey company, Trend Research, helped to convene anonymous focus groups in Lethbridge and Edmonton. After the questionnaire was further refined and pre-tested, the online survey was implemented with Qualtrics Inc. A soft launch was first undertaken, followed by a full survey in March 2019.

The survey(s) was completed by 534 residents of the Edmonton region, 545 residents of the Calgary region, and 224 residents of the four other smaller cities. 62% of respondents were women. 75% of respondents had completed some form of post-secondary education and 46% of respondents were working full-time.

Results - Survey 4

1. 65% of respondents agreed, or strongly agreed, that land in agricultural uses helps to clear air and water and helps conserve the diversity of natural systems. 61% of respondents agree, or strongly agree, that it is desirable to live near land in agricultural uses, while 93% of respondents agree or strongly agree that it is important to preserve land in agricultural uses for future generations.
2. Relative to the 2000-2016 development trend in their area, 9% favoured more expansionary forms of urban development, 30% preferred to continue the 2000-2016 trend, while 61% preferred denser forms of urban development that would reduce pressure to convert surrounding farmland.
3. Half of the respondents were asked about their willingness to pay toward the conservation of an additional 1000 acre parcel of farmland somewhere within 10 km of current urban areas. 66% of those respondents were willing to make a one-time contribution of \$50 toward that conservation, while 39% were willing to make a one-time contribution of \$1000.
4. Half of the respondents were asked about their willingness to receive compensation to allow an additional 1000 acre plot of farmland to be developed within 10 km of current urban areas. 44% indicated that they would be willing to allow that development in return for a one-



time tax reduction of \$1000, while 24% would be willing to allow that development in return for a one-time tax reduction of \$50.

5. This difference between willingness to pay for conservation, and willingness to accept compensation for development, is consistent with the theory of economic theory of "loss aversion." We are less willing to give up things that we have than to pay for things that we don't have. This study may be one of the first to show that loss aversion holds for the non-market benefits of living near to open space.

