ALBERTA LAND INSTITUTE ANNUAL REPORT 2015-2016

CONNECTING RESEARCH AND POLICY FOR BETTER LAND MANAGEMENT




UNIVERSITY OF ALBERTA
Alberta Land Institute

ALBERTA LAND INSTITUTE ANNUAL REPORT 2015-2016

CONNECTING RESEARCH AND POLICY FOR BETTER LAND MANAGEMENT

TABLE OF CONTENTS

ALBERTA LAND INSTITUTE
- Our Mission & Areas of Study 2
- Our Advisors 4

RESEARCH
- Research 6
- Project Updates 8
- New Research 17

LAND USE 2016 CONFERENCE
- Overview 18
- Lessons & Opportunities 20
- Student Posters 21

STRATEGIC PRIORITIES
- Knowledge Exchange 22
- Informing Policy 24
- Building Capacity 26

ABOUT US
- Staff & Contact Information 28

UNIVERSITY OF ALBERTA
Alberta Land Institute

OUR MISSION & AREAS OF STUDY

We bring together diverse groups of academic researchers to conduct objective, impartial, interdisciplinary research into complex land use issues relevant to Alberta.

The Alberta Land Institute (ALI) is an independent research institute based at the University of Alberta, with a mandate to connect research with policy for better land management. We bring together diverse groups of academic researchers to conduct objective, impartial, interdisciplinary research into complex land use issues relevant to Alberta. Our focus lies in four areas: Agriculture, Water, Municipal Development, and Governance.

These four areas, described below, are not considered in isolation. In certain cases, research funded by ALI may address just one, but in most instances, the research we support considers the interaction of two or more. The intersection of these themes is often where tension arises — between groups in society, between economic and environmental interests, or between jurisdictions.

These intersections also highlight the need for examination through multiple disciplines. The assessment of tradeoffs within or between these sectors often requires expertise from the social sciences, natural sciences, and engineering. We bring together research teams with the ability to address questions from many different perspectives, and share their findings with policy-makers, stakeholders, and the public across Alberta, and beyond.

Agriculture

Agriculture remains one of the pillars of Alberta's economy. However, much of the province's best farmland can be found in the corridor between Edmonton and Calgary — the same areas where population growth is creating demand for new homes.

The questions that arise are no secret to Albertans: are we losing our farmland? If improved efficiency and technology has opened new land to cultivation, how does that land compare to land that we were cultivating before?

Can policy prevent loss, and what could be the consequences if laws were passed to deny farmers their rights to modify their land use? Will the provision of ecosystem services, through projects like wetland restoration, provide new economic opportunities for farmers and land owners in the future?

Water

Vital to human life, agriculture, and industry, water is a resource of great importance — particularly in Alberta. While other research institutes specialize in questions of water quality and biodiversity, we support research that examines water's importance to land use.

How can water policy related to irrigation influence industrial growth and community development in a place like southern Alberta — where water basins are fully allocated? Might the restoration of wetlands on private agricultural land benefit watersheds — could floods be mitigated, or water purified?

Municipal Development

As the population grows, so do the cities. Many institutes have begun to consider the development of municipalities, so we direct our focus to questions surrounding the footprint of these communities upon the land.

Does the growth of cities and towns in Alberta qualify as 'urban sprawl', or is that term even properly understood? Can densification and improved municipal and regional planning protect some of Alberta's finest farmland and the ecosystem services it provides, and what might the socio-economic consequences of such planning be for farmers, urban dwellers, and the public at large?

Governance

Policy is central to all of ALI's research. Understanding how the decisions of government influence the use of land in Alberta is vital to helping shape the province's course for generations to come. While this policy consideration is often embedded within the examination of other subjects, it is sometimes necessary to look directly at existing processes of government, and the influence they hold.

How have individuals' property rights in Alberta been influenced by the implementation of the province's Land Use Framework? How does Alberta's property rights framework compare to that of other jurisdictions? Are municipalities positioned to collaborate on regional planning?

These four areas are not independent of each other. In most instances, the research we support considers the interaction of two or more.

OUR ADVISORS

Dr. Lorne Babiuk

OC, PHD, DSC, FRSC

Community Advisory Board Chair

"Over the past year, our researchers have briefed elected officials and civil servants."

As new and proposed policies begin affecting land management and regional planning across Alberta, impartial academic research becomes increasingly vital for decision-makers. The Alberta Land Institute helps facilitate better land management through such research, and by connecting research and data with policy-makers.

Over the past year, our researchers have briefed elected officials and civil servants, consulted extensively with stakeholders, and shared knowledge directly with the public, all in order to inform complex policy discussions. In May, the second bi-annual Land Use conference (page 18) brought global experts together with Alberta decision-makers and stakeholders, to share insights and best practices. More than 200 people took part, with surveyed participants overwhelmingly praising the quality and value of the information presented.

As chair of the ALI Community Advisory Board, I have been delighted with the Institute's work in 2015-16. I thank our board members for their engagement, and for the insights they provide. Their efforts, along with those of our researchers and staff, are essential to ALI's ability to connect research with policy for better land management.

Members of the ALI Community Advisory Board:

Throughout 2015-2016, ALI has greatly benefited from the contributions of these members of the Community Advisory Board:

Dr. Lorne Babiuk (Chair)

Mr. David Bissett

Mr. Rick Blackwood

Mr. Tom Grabowski

Ms. Kelly Hall

Mr. Colin Jeffares

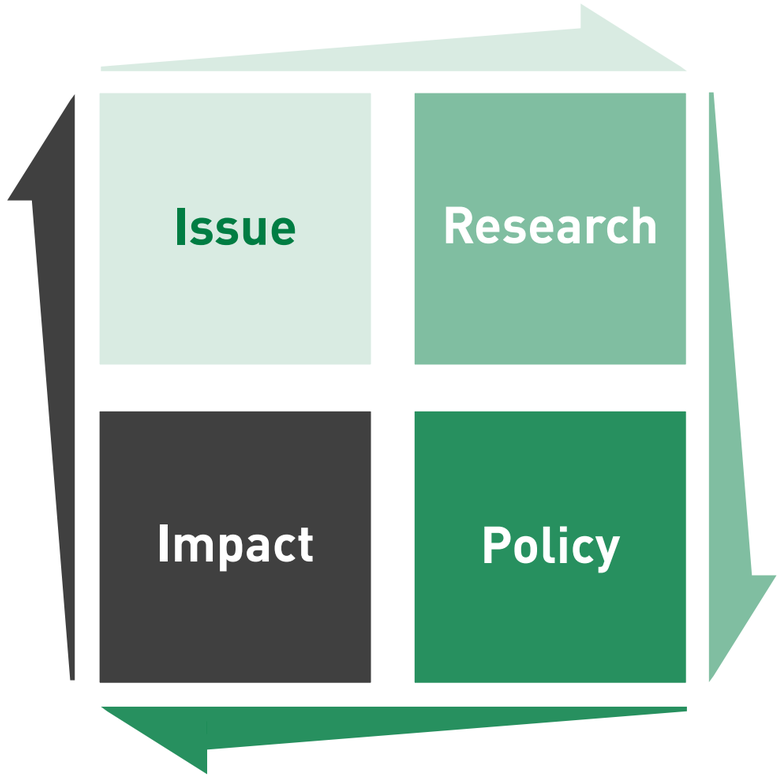
Dr. F.L. (Ted) Morton

Mr. Gerald Rhodes

Ms. Kim Sturgess

Mr. Peter Woloshyn

Mr. Todd N. Zimmerling



Where can objective research make a difference?

Determining what land management issues might benefit from the attention of independent researchers can be a complex process. Sometimes, information on a subject is available, but decisions are being deferred for reasons that an academic study would do nothing to change. Sometimes, the nature of an issue means it would be best addressed in a non-academic manner.

In order to identify issues which would be beneficially informed by research, the Alberta Land Institute draws upon the expertise of its Community Advisory Board. Board members provide ALI with input about emerging trends, and raise questions that are proving significant to land use in Alberta. This advice helps the Institute decide what subjects warrant study.

Once a suitable research question is posed, a call for proposals leads to research. The research findings are then connected to policy, and an assessment is made of the impact of that policy recommendation. The impact assessment often highlights additional questions and knowledge gaps, leading to new potential research.

RESEARCH

Dr. Vic Adamowicz
PHD

Research Director

"When research and policy comes together the result can be a very powerful force for positive development."

Academic, curiosity-driven research can seem a world apart from the challenging policy decisions that guide land management in Alberta, but when research and policy comes together the result can be a very powerful force for positive development. Creating this synergy is not easy; researchers and politicians operate on different timelines and with different priorities, but common ground can often be found.

From this perspective, it has been an important year for ALI research. Long-term projects have either been completed or proven successful enough to warrant an extension, and many of our researchers' findings have informed decision-makers about sensitive subjects such as the conversion and fragmentation of Alberta's agricultural land, the new Alberta Wetland Policy, and compensation for oil and gas disruptions on grazing leased land.

The coming year will see ALI continue to build upon these successes. New research teams will study issues of regional planning, the development of a natural capital account for Alberta's agricultural land, and the provision of ecosystem services. A great deal of important work lies ahead, as the Institute continues to inform the development of land management policy in Alberta, and beyond.

Research Advisory Committee

The Research Advisory Committee works with ALI's Research Director to ensure that projects funded by the Institute adhere to strong fundamental research principles — that they remain objective and impartial. These experts also help ALI frame questions that are appropriate for academic research, and provide support as the Institute selects projects during each call for proposals.

The present ALI Research Advisory Committee includes the following members:

Dr. David S. Chanasyk
University of Alberta

Dr. Don Flaten
University of Manitoba

Dr. David Pannell
University of Western Australia

Dr. Enid Slack
University of Toronto

Research Projects

Multi-Year Projects

- Alberta's Living Laboratory Wetlands Project
- Systems Modelling Sustainable Land and Water Policy in Alberta's Irrigation Sector

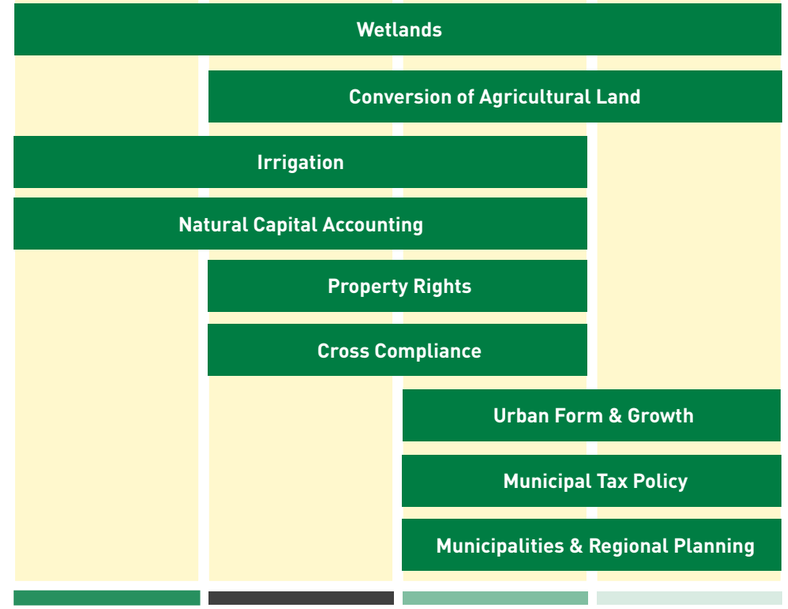
Single-Year Projects

- Natural Capital Accounting of Agricultural Land in Alberta

Completed Projects

- Economic Evaluation of Farmland Conversion and Fragmentation in Alberta
- Urban Form, Land Use and Sustainability: Recommendations and Key Research Gaps
- Municipal Governance Reform and Land-Use Planning in Alberta
- Municipal Revenue Generation and Implications for Land Use and Environmental Quality
- Linking Environmental Goals with Business Risk Management Programs in Canadian Agriculture
- Assessing Property Rights and Land Use in Alberta

Matrix: ALI Research Projects & Areas of Study



RESTORING WETLANDS IN THE FIELD

Alberta's Living Laboratory Wetlands Project

Above:
Graduate students Anna Waz and Anna Kauffman groundtruthing potential wetland restoration sites; aerial LiDAR map from the Nose Creek Watershed; Dr. Shari Clare moderating an ecosystem services panel discussion; Dr. Peter Boxall presenting the details of the reverse auction process.

The Alberta's Living Laboratory wetlands project is a multi-year, interdisciplinary research project examining the science and economics of wetlands restoration in Alberta. This is a timely subject, because a new Wetland Policy is coming into force in the province, changing the replacement requirements for wetlands lost due to development.

In the scientific sphere, the project is using some of the most advanced techniques available to create tools to predict the functions a wetland might provide if it is restored. Once wetlands are restored as part of the project, they will be studied on an ongoing basis, so that the accuracy of these tools' predictions can be assessed. Both the tools and the improved understanding that accompanies them will help inform policy-makers and developers as they work with Alberta's new Wetland Policy.

At the same time, an economic study is being undertaken, examining the true cost of restoring wetlands on private land — including the cost of land owner compensation. Using a 'market-based instrument', the research team is engaging with land owners to set the price for restoration. By partnering with land owners, the project will develop a deeper understanding of the factors that influence the cost of wetland restoration, while also testing a system that might allow for more efficient use of wetland restoration budgets. This knowledge will be useful both for policy-makers, and for those seeking to meet their restoration obligations under the new policy.

Alberta's Living Laboratory Wetlands Project

Principal Investigators:
Dr. Peter Boxall
Dr. Irena Creed

Co-Investigator:
Dr. Shari Clare

Areas of Study:
Water
Agriculture
Governance
Municipal Development

Extended:
2013 – 2017

For more information:
albertalandinstitute.ca/wetlands

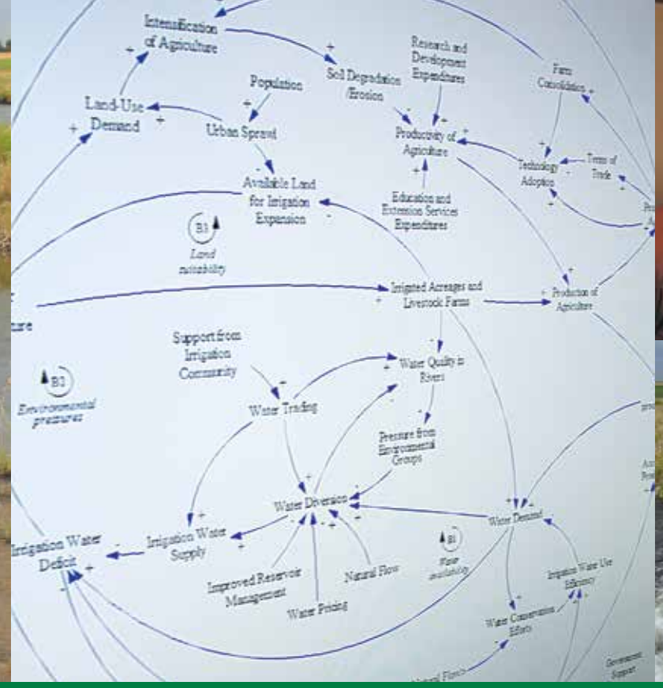
Auction complete and grading processes developed

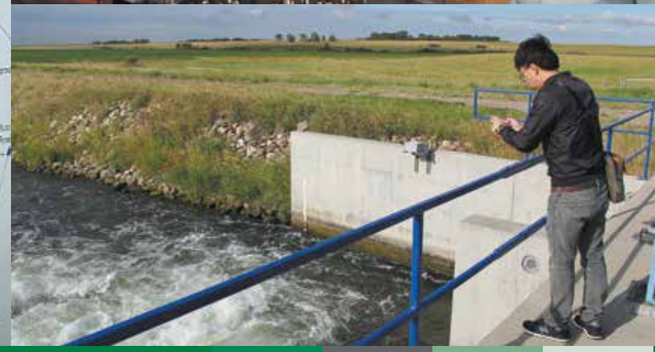
The Alberta's Living Laboratory wetlands project completed its reverse auction this year, with four eligible bidders and eleven selected restoration sites. Contracts for the restoration of those sites were signed in July 2016, and Ducks Unlimited will compete restorations in the fall of 2016.

While the reverse auction was being conducted, significant progress was made in the development of remotely-sensed processes to grade potential wetland restoration sites according to the categories established under the Alberta Wetlands Policy (A, B, C, and D). In future, these processes will support the policy by reducing the amount of on-site analysis necessary to establish each site's grade.

The research team is currently considering whether to conduct a second reverse auction, making additional use of the grading process and gathering further information about potential bidders and their motivations. Sequential auctions have proved valuable for restoration work in Australia, though in Alberta, there may be legislative barriers to repeating the process. As this option is explored, research has been extended into 2017.

In the interim, twelve academic papers with work from eight graduate students are currently being planned, each based on a different aspect of this diverse research project.





MODELLING ALBERTA'S IRRIGATION SYSTEM

Systems Modelling and Alberta's Irrigation Sector

Above:
The research team tours the Western Irrigation District with General Manager Erwin Braun; a systems loop diagram; the research team at a consultation workshop in Lethbridge, Alberta; PhD student Kai Wang recording details of irrigation system functions.

This three-year research project focuses on the opportunities and risks associated with irrigated agriculture in the province in the short- and long-term. The objective of the program is to identify the relationships between irrigated agriculture and economic, environmental, social, and policy factors. It also seeks to identify and assess the impacts of alternative policy options on the irrigation sector in the province over the next twenty-five years. This work is being conducted in several stages.

First, a variety of water management policy options are being identified through literature reviews, meetings with an advisory panel of stakeholders and policy-makers, and the identification of cause-and-effect relationships between key economic, environmental and social factors. Identified options are then being evaluated using a systems model that simulates the potential near- and long-term economic, environmental and social impacts associated with the implementation of each option, while also highlighting potential unintended consequences.

This analysis is being further supported by sub-projects relating to the environmental and economic impacts of various "what-if" scenarios, benefit-cost analysis, analysis of water- and land-use impacts, and analysis of risks and mitigation strategies. Taken together, these studies and the systems model built as part of the project will be of great use to policy-makers engaged with the issue of water management in Alberta's irrigated districts.

Systems Modelling Sustainable Land and Water Policy in Alberta's Irrigation Sector

Principal Investigators:
Dr. Evan Davies
Dr. Miles Dyck

Areas of Study:
Water
Agriculture
Governance

Extended:
2013 – 2017

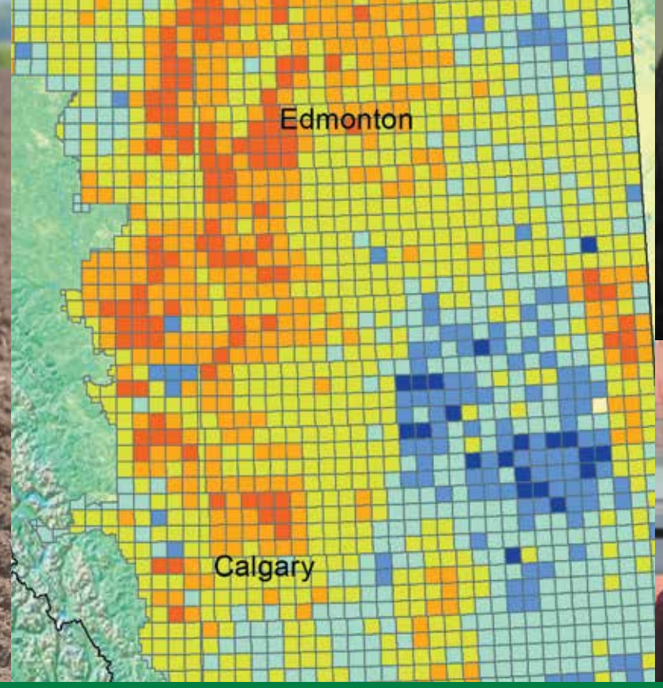
For more information:
albertalandinstitute.ca/irrigation

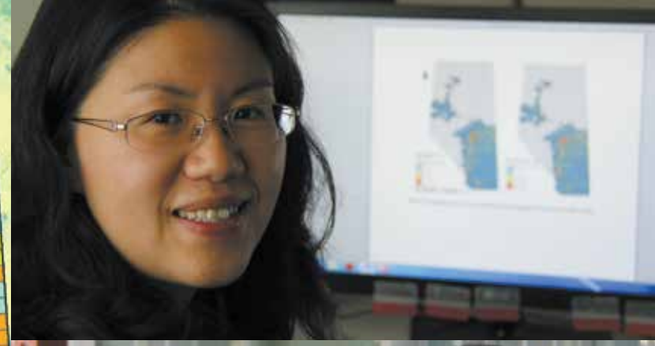
Unprecedented capability delivered under budget

Construction and validation of the systems model for this project is now essentially complete, creating a tool with unprecedented functionality. While existing Alberta irrigation models operate on a daily timestep (simulating one day at a time), the project's model is proving comparably accurate while operating at a weekly timestep. This allows simulations to run for multi-year periods, instead of for a single season.

In December 2015, the research team held a workshop with irrigators and stakeholders in Lethbridge, Alberta. After sharing preliminary findings and demonstrating modelling techniques and methods, the researchers received valuable feedback and gained access to new sources of data.

Work to date has been completed without fully utilizing the initial allocation of funds, so ALI has elected to extend the project by one year, allowing time for further refinement and integration. In the months ahead, the research team will undertake the coordination of a systems model with an agent-based model — a connection between modelling techniques from different disciplines that has never been attempted. If successful, this coordination could further increase the detail provided by the model, making it a more useful tool for decision-makers considering Alberta's water management policy.





TRACKING LAND FRAGMENTATION

Economic Evaluation of Farmland Conversion

Above:
Graduate student Darren Haarsma visiting a farm during the project research process; a map of Alberta showing rates of land conversion; Dr. Feng Qiu working on GIS mapping; graduate students Angela Bentley and Haoluan Wang.

This three-year project focused on the economics of fragmentation and conversion of agricultural land to non-agricultural uses in Alberta. The objective of the research was to assess and quantify the economic impacts and implications of land fragmentation and conversion for policy and planning.

To engage with this complex issue, the project team conducted four related studies that focused either on the province as a whole, or on two areas within the province: the Capital Region around Edmonton, and the Highway 2 corridor linking Edmonton and Calgary.

The first study made use of Geographic Information System (GIS) modeling and remote sensing analysis to identify patterns of land use and land use change over time. The second study undertook an economic analysis to identify factors (relating to both ownership and policy) that impact conversion in both the province as a whole, and in the specific study sites. The third study used statistical techniques to examine the economic relationships between conversion and a variety of influencing factors, including land values. Finally, the fourth study defined and evaluated the public values associated with, and the public interest in, goods and services associated with the lands in the Capital Region.

Taken together, the four studies examined how current policies impact the level and rate of conversion and fragmentation, and identified policy and planning options that could assist in future management of fragmentation and conversion in Alberta.

Economic Evaluation of Farmland Conversion and Fragmentation in Alberta

Principal Investigators:
Dr. Scott Jeffrey
Dr. Brent Swallow

Areas of Study:
Agriculture
Governance
Municipal Development

Completed:
2013-2016

Download the report:
albertalandinstitute.ca/fragmentation

Multiple published papers and ongoing research

With all four components of its research complete, the project Economic Evaluation of Farmland Conversion and Fragmentation in Alberta delivered its final report in the spring of 2016. One critical finding identified by the project is that from 2002-2012, agricultural land in Alberta was converted to non-agricultural uses at a rate of 0.82% per year, with 68.4% of the converted land being high-quality farmland. In the Edmonton area, the conversion rate was higher, at 4.3%.

Research from the project has already been cited in the press, and in work done for the Capital Region Board. Four academic papers have also been published related to the project, and numerous posters have been presented by students who were involved in the research.

Some work completed as part of this project will also help inform new research. With funding from ALI and other partners, Principle Investigator Brent Swallow will establish a new project in 2017, to consider the social values related to land conversion and fragmentation in order to inform policy. A new project has also been launched to examine the possible creation of a natural capital account for Alberta's agricultural land base could be measured in monetary terms.

UNDERSTANDING URBAN SPRAWL

Urban Form, Land Use and Sustainability: Recommendations and Key Research Gaps

Principal Investigator:
Dr. Sandeep Agrawal

Areas of Study:
Governance
Municipal Development

Completed:
2016

Download the report:
albertalandinstitute.ca/urbanform

Urban growth in Alberta has taken various forms, including downtown, inner-city, and exurban development. Most growth, however, has been suburban. A substantial literature exists on urban growth and its forms, most under the rubrics of 'urban sprawl' (focusing on its costs, causes, and remedies) and more recently, opportunities for 'smart growth'.

What did not exist was a systemic understanding of the growth of cities and towns in Alberta, and the reasons, context, and regulatory framework under which that growth occurred. It was unclear what level of density, degree of mixed use, and access to transit might be considered 'sustainable'. The effectiveness of taxation, development or congestion charges, and other economic and regulatory mechanisms geared towards fostering 'sustainable' growth was also uncertain.

This one-year project sought to develop a 'state of knowledge' report focusing on Alberta, in order to identify criteria by which sustainable urban or suburban growth could be evaluated. It also set out to clarify mechanisms to foster sustainable growth, and describe the key research gaps in understanding the benefits and costs of urban form.

Released on the ALI website in July 2016, the project's final report lays out recommendations for the management of urban growth in the province, and identifies a number of significant questions which may be addressed in future research by the Institute, including whether 'wet growth' (urban planning based on water availability) could be an appropriate new method for managing the development of municipalities.

Other work might include a more thorough study of regional organizational options for Alberta (based on both outside examples and historical Alberta precedents), assembling more thorough data for the Calgary region, and developing a better understanding of municipal revenue tools under the revised Municipal Governance Act. Additional investigation into Transfer Development Credits could also be warranted. Principal Investigator Dr. Sandeep Agrawal will continue to work with ALI on these and other questions.

GRAZING LEASE COMPENSATION

Alternative Models of Compensation on Alberta's Crown Grazing Lease Lands

Internal Project Authors:
Stacey O'Malley
Alicia Entem
Dr. Eran Kaplinsky
Dr. Vic Adamowicz

Areas of Study:
Governance

Completed:
2016

Download the report:
albertalandinstitute.ca/grazing-leases

Ahead of a policy change in the Municipal District of Taber, the Alberta Land Institute conducted an internal project to study the system that compensates Alberta grazing leaseholders for oil and gas disruptions on land that they lease.

During their investigation, members of the research team relied on publicly-available information to develop a list of Alberta's grazing leases, and to create estimates of the average compensation paid to leaseholders for oil and gas disruptions. This allowed them to outline the scale of the compensation payments which leaseholders might currently be receiving as a result of their privately-negotiated agreements with oil and gas producers. After completing this research, the team organized a workshop including numerous representatives from the leaseholder community, conservation groups, and government, which provided valuable insight into the nature of the system.

Thanks to this consultation, the research team identified two important questions about the function of the compensation system: whether these payments (guided by rulings of the Alberta Surface Rights Board) accurately reflect the actual costs related to a given disruption, and whether the rental rates paid by leaseholders reflect the true value of the leased land. In its final report of January 2016, the research team observed that any future changes to compensation policy should reflect an understanding of both these questions.

While the research team examined this issue, Alberta's Auditor General conducted a separate study. Using a different method, the Auditor General calculated possible compensation payments being received by leaseholders, and expressed concern that these funds might in fact be owed to the Government of Alberta. This position was not consistent with the research team's findings, but did draw media attention to the subject, leading to interviews about the ALI report upon its release, and direct consultation with government and stakeholder groups.

The future of Alberta policy in this area is unclear, but ALI will monitor the situation and determine whether future research is warranted.

ADDITIONAL COMPLETED PROJECTS

Linking Environmental Goals with Business Risk Management Programs in Canadian Agriculture

Principal Investigators:
Dr. James Rude
Dr. Alfons Weersink
Dr. James Unterschultz
Dr. Scott Jeffrey

Areas of Study:
Agriculture
Governance

Completed:
2016

Download the report:
albertalandinstitute.ca/cross-compliance

What Could Cross-Compliance Mean For Our Farms?

Business Risk Management (BRM) programming began in 1958 in Alberta, as a way to stabilize farm incomes. Now, as new environmental, social, and economic goals emerge for the agricultural sector, suggestions have been made that these goals should be linked to BRM support.

In the Federal/Provincial policy framework *Going Forward II*, the possibility of 'cross-compliance' was raised in relation to the support program AgriInvest: individual provinces or territories "may require participants to comply with certain criteria before they are eligible to receive government contributions under AgriInvest." Those criteria were broadly defined to include traceability, the environment, business development, and innovation.

Dr. James Rude led this one year project to study global examples of this sort of cross-compliance in action. Reviewing regulations from the EU, the US, and Quebec, he developed a conceptual model to produce simulations that quantify the potential impact of hypothetical AgriInvest cross-compliance on farms. His findings suggest that cross-compliance may lead to adverse environmental impacts, and be difficult to enforce.

Municipal Revenue Generation and Implications for Land Use and Environmental Quality

Principal Investigator:
Dr. Bev Dahlby
Dr. Melville McMillan
Brian Conger

Areas of Study:
Governance
Municipal Development

Completed:
2016

Download the report:
albertalandinstitute.ca/municipal-revenue

How Do Municipal Revenue Tools Influence Sprawl?

Alberta's municipalities generate local revenue through residential and business property taxes, user fees for services, licensing, and a host of discretionary tax tools that include business taxes, special taxes and development-related levies. Concerns have been expressed about the adequacy of these revenue sources to meet municipal responsibilities and whether the current revenue sources have contributed to urban sprawl, land fragmentation and infrastructure duplication. Nowhere is this more evident than in the Edmonton and Calgary metropolitan areas, where the expansion has resulted in tension between cities and their rural and small urban centre neighbours.

This research project explored the factors driving urban growth and considered whether municipal revenue sources have influenced development decisions within the rural-urban fringe in the Calgary and Edmonton metropolitan regions. It found that reliance on property taxes and user charges reduces sprawl in Alberta by between 15% and 30%, and suggests that sprawl might increase by 8% in Calgary and 16% in Edmonton if Alberta implements a system of city charters, granting these municipalities non-property taxation powers.

NEW RESEARCH

Natural Capital Accounting for Agricultural Land

Natural capital accounts allow for the measurement and valuation of natural resources in a manner which meets accepted accounting standards. Statistics Canada has developed natural capital accounts for a number of Canadian resources, but no accounts have been developed for the country's agricultural land. Establishing natural capital accounts to the United Nations standard is complex, and requires considerable time and resources. For this reason, Statistics Canada alone cannot build all the natural capital accounts which might be of use to policy-makers in Canada.

In this research project, Principal Investigator Dr. Marian Weber and her team will explore what data exists that might be used in establishing a natural capital account for Alberta's agricultural land, and determine what additional sources might be required. Her team will also examine existing and experimental natural capital accounting frameworks to determine which might be appropriate for implementation or testing in the Alberta context.

Developing and Testing a Framework and for Accounting for the Value of Agricultural Land Stocks and Flows in Canada's System of National Accounts

Principal Investigator:
Dr. Marian Weber

Areas of Study:
Water
Agriculture
Governance

Scheduled:
2016-2017

Learn More:
albertalandinstitute.ca/natural-capital-agland

Future Call For Proposals

For its next call for proposals, ALI is considering topics in two broad areas of study. The decision about which areas to pursue will be made in consultation with researchers, partners, and the ALI Community Advisory Board.

Grasslands & Ecosystem Services

Across North America, grasslands systems provide numerous ecosystem services, but are under pressure from many types of development (energy, agriculture, and municipal). In Alberta, the highest concentrations of threatened species can be found in grasslands systems, including the only species under a Species At Risk Act emergency protection order. Alberta's land use and property rights framework also makes planning around grasslands systems complex. In order to clarify this situation, ALI may consider a study of grasslands systems, the ecosystem services they provide, and the impacts of current and potential policy and management approaches.

Regional Planning & Urban Growth

In his Urban Form study (page 14), Dr. Sandeep Agrawal identified several possible research questions related to regional planning. Based on this work, ALI may consider issuing a call for proposals on one of the following: wet growth as a means for understanding urban planning; options for a 'made in Alberta' regional planning system; municipal revenue tools in the new Municipal Government Act; or Transfer Development Credits in Alberta.

LAND USE 2016: CONFERENCE OVERVIEW

A Global Perspective on Regional Planning in Alberta

Above:
ALI Research Director Vic Adamowicz opens Land Use 2016; presentation by Anish Neupane, Alberta Environment & Parks; audience question from graduate student Anna Kauffman; plenary speaker Dr. David Pannell discussing research with Student Poster Competition runner-up Dareskedar Amsalu.

This year saw the second edition of the Alberta Land Institute's bi-annual Land Use conference. Land Use 2016 brought together experts from Alberta and around the world to examine the subject of regional planning — how it influences the provision of ecosystem services, agriculture industries, and governance. More than 200 attendees shared diverse expertise during informative discussions, and helped identify potential research questions.

Leading each major policy stream was an international speaker, providing global context for issues facing Alberta. In the first policy stream — regional planning for ecosystem goods and services — Dr. David Pannell from the University of Western Australia shared some of his country's experiences with using market-based instruments to support the provision of ecosystem services. His presentation (available on the ALI website) highlights the importance of good leadership and patience whenever a government seeks to develop effective systems for ecosystem services provision. A panel discussion then considered ecosystem services in the context of municipal priorities, and breakout sessions examined both conservation offsets as a tool for conservation, and the role ecosystem services might play in municipal risk management.

The second policy steam addressed the question of land use and Alberta's changing agriculture industries. Dr. Andrew Plantinga, from the University of California Santa Barbara, opened with a series of case studies from the United States. An expert panel then discussed land conversion and irrigation in Alberta, before breakout sessions further considered land conversion and fragmentation, and the pressure on land use applied by different municipal revenue generation tools.

The final policy stream explored governance and regional planning. Professor Allan Wallis from the University of Colorado Denver opened with examples from Oregon, Colorado, and Utah, demonstrating how land use policy could develop differently depending on political traditions and voter expectations in a given jurisdiction. An expert panel then reviewed Alberta's Land Use Framework, before breakout sessions explored how municipal planning functions within the framework, and discussed the framework's scientific thresholds.

The final session at Land Use 2016 was a Keynote Address delivered by Dr. Ian Bateman, OBE, FRSA, FRSB, about the United Kingdom's National Ecosystem Assessment — a substantial undertaking in which the UK government commissioned a valuation of all of the nation's ecosystem services, to better inform future economic and environmental policy. As head of the economic assessment for that study, Dr. Bateman was able to provide numerous real-world examples of how research could inform and influence policy.

After the Keynote address, the Ecosystem Services + Biodiversity Network, a group established by presenting partner Alberta Innovates Bio Solutions, hosted a special open house showcasing ecosystem services projects being conducted in Alberta.

Presenting Partner

Alberta Innovates Bio Solutions

Our Sponsors

City of Edmonton

Natural Resources Conservation Board

Ducks Unlimited Canada

University of Alberta Faculty of Agricultural, Life and Environmental Sciences

Nature Conservancy Canada

Kule Institute for Advanced Study

LESSONS AND OPPORTUNITIES

A Valuable Investment for Attendees

Surveys conducted at the end of Land Use 2016 and subsequent feedback gathered online confirmed that attendees found the conference to be highly valuable, with some 94.2% agreeing that they "received adequate value relative to the investment" of attending the event. The same percentage indicated that they would recommend Land Use 2018, and other ALI events, to a colleague.

This strong positive response demonstrates the Institute's strength in outreach and knowledge exchange, though opportunities for improvement certainly exist.

Greater Interactivity

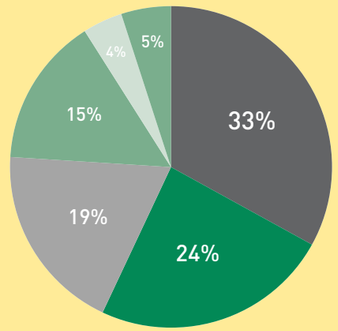
Attendees consistently reported being impressed by the volume and value of the information presented at Land Use 2016. Unfortunately, the intense conference program did not allow for a great deal of interaction during sessions — time for audience questions and discussion was limited. Recognizing this, ALI will work to allocate additional time for interaction, networking, and participation at future conferences, workshops and events.

Rural Voices

One observation made by the ALI team, and reinforced in feedback from attendees, was that in sessions related to municipal governance, planning, and policy, the speakers generally reflected perspectives from Alberta's more heavily populated urban areas — Edmonton, Calgary, and Grande Prairie.

These speakers provided highly-valuable perspectives on subjects such as municipal revenue generation and municipal planning, but were not able to speak to the perspectives of some of Alberta's smaller communities. Unique land use and planning challenges exist in those areas, which ALI wishes to more fully explore and understand. As such, the Institute is working closely with partners to increase rural municipality participation at future events.

ATTENDANCE BY SECTOR



33%	Municipalities
24%	Government
19%	Academic
15%	NGO
4%	Industry
5%	Other

ATTENDEE FEEDBACK SCORES

Out of a possible 5 points

4.23	Quality of Event
4.19	Wine & Cheese Event
4.11	Student Posters
4.04	Topics & Content
4.03	Networking
4.00	Presentations, Panelists, Moderators

STUDENT POSTER COMPETITION

Supporting a new generation of researchers

Eight students were selected to share their latest research in Land Use 2016's student poster competition. As part of the competition, two runners up would each receive a cash prize of $150, while the winner would receive both $300 and the opportunity to introduce his or her research immediately prior to the conference's closing keynote address.

Selecting the winner was the responsibility of ALI Community Advisory Board member Kelly Hall, and Alberta Innovates Bio Solutions Executive Director Carol Bettac. Combining their diverse expertise, these two judges met each student and assessed his or her poster based on criteria such as quality of writing, presentation, and subject matter expertise. Once the process began, it quickly became apparent that the judging would not be easy.

In an assessment process that ultimately took twice as long as expected, no student was rated lower than 15 out of 20 on an exacting scoring scale. All eight students had exceeded expectations typical for this sort of competition, and all were praised by ALI Research Director Vic Adamowicz before he announced the winners.

Ultimately, the runners up were University of Alberta students Qi Wang, for her poster *Decomposition of farmland value and conservation targeting in Alberta*, and Dareskedar Amsalu, for his poster *Who Benefits from Irrigation and Who Should Pay for It? A Case of Southern Alberta's Irrigation.*

The winner was Marcus Becker, from the University of Alberta's Department of Resource Economics and Environmental Sociology, for his poster *Tradeoffs Between Environmental Quality and Economic Returns from Agriculture: A Case Study of the Lower Little Bow Watershed, Alberta.* In his research, Marcus investigated the outcomes of various agricultural practices — such as the addition of alfalfa or the application of manure — to develop 'tradeoff curves' which help identify what actions are both economically and environmentally beneficial.

Student Posters

Mohamed Ammar
Modelling Irrigated Agriculture Policy Alternatives in Alberta using System Dynamics.

Dareskedar Amsalu RUNNER UP
Who Benefits from Irrigation and Who Should Pay for It? A Case of Southern Alberta's Irrigation.

Marcus Becker WINNER
Tradeoffs Between Environmental Quality and Economic Returns from Agriculture: A Case Study of the Lower Little Bow Watershed, Alberta.

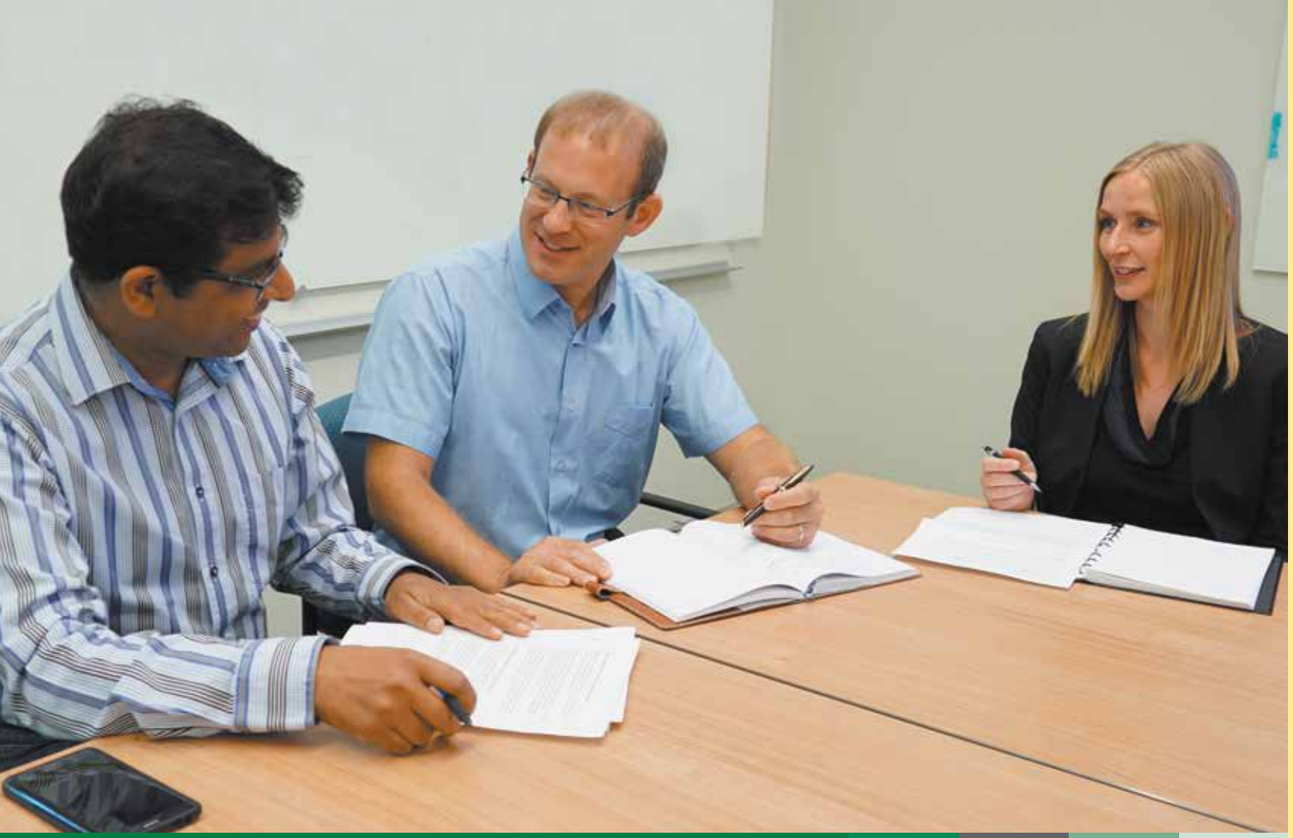
Angela Bentley
Does Farmland Fragmentation and Conversion Affect Land Values? Evidence from Alberta, Canada.

Bijon Brown
Impacts of Differing Water Rights Regimes on Water Market Trading Liquidity and Ensuring Welfare Impacts on Agricultural Producers: An Agent-Based Modelling Approach.

Evan Joyes
Sustainable Development Credits.

Sarah Prescott
Modelling of Staging Area Choice for Off Highway Vehicle Riders.

Qi Wang RUNNER UP
Decomposition of farmland value and conservation targeting in Alberta.



KNOWLEDGE EXCHANGE

Exchanging Knowledge Beyond the Research Community

Above:
Dr. Sandeep Agrawal and Dr. Eran Kaplinsky meet with Tasha Blumenthal, Policy Analyst from the Alberta Association of Municipal Districts & Counties, to discuss potential workshops for the AAMDC Convention.

Research is most valuable to policy when it can be shared. Though the Alberta Land Institute places significant emphasis on the academic success of its research projects — the extent to which they lead to peer-reviewed publications and the opportunities they provide for training graduate students — the exchange of knowledge with numerous non-technical audiences remains vital to the Institute's strategy.

Over the past year, ALI has expanded its strong partnerships with groups and organizations outside the academic world, with the objective of making the most current research available and useful to those who engage with land use issues on a daily basis. This has been accomplished through the creation of accessible documents such as backgrounders based on research reports, the delivery of presentations to non-academic audiences, and the engagement of stakeholders in workshop environments.

As the relationship between ALI and its existing partners continues to strengthen, the Institute looks forward to new opportunities to exchange knowledge, and to assist Alberta's decision-makers in engaging with land management issues and policy.

Our Partners

Over the past year, ALI has worked closely with numerous partners to help fund research, exchange knowledge, and inform policy. We look forward to continuing our strong relationships with these and other organizations:

- The University of Alberta
- Western University
- Alberta Innovates – Bio Solutions
- Alberta Environment & Parks
- Alberta Agriculture & Forestry
- Alberta Urban Municipalities Association
- Alberta Association of Municipal Districts & Counties
- Rocky View County
- City of Edmonton
- City of Calgary
- Ducks Unlimited Canada
- Kule Institute for Advanced Study
- Nature Conservancy Canada
- Natural Resources Conservation Board
- Fiera Biological

Engaging international expertise

Dr. Patrick O'Connor, a consultant and adjunct professor at the University of Adelaide, has conducted sixteen reverse auctions, allocating some $40 million to conservation projects in Australia. He was also contracted to undertake a review of the BushTender program. His unparalleled expertise grants him a variety of practical insights into the use of market-based instruments for conservation, which is why researchers from the Alberta's Living Laboratory wetlands project (page 8) sought his advice about their reverse auction for the restoration of wetlands in the Nose Creek watershed.

In partnership with the University of Alberta's Distinguished Visitors Fund and the Department of Resource Economics and Environmental Sociology (REES), ALI and the project research team invited Dr. O'Connor to Edmonton for a week of consultations. During his visit, he shared his expertise with the researchers, delivered lectures to students, and took part in a public forum examining the viability of conservation auctions for Alberta.

At the forum, he reflected on the importance of credible and effective communication — in his case, foregoing newspaper ads in favour of personally visiting every local "Footy" club when promoting an auction in the area. He identified landholder resistance to actions taken into perpetuity, pointing out that "perpetuity is really long — especially near the end." He also elaborated on the importance of setting clear expectations, then working with landholders over the course of their contracts to ensure compliance, and to promote ongoing positive land stewardship practices.

Thanks to the partnership of the Alberta Environment and Parks Watershed Resiliency and Restoration Program, video of the entire forum is available at albertalandinstitute.ca.

INFORMING POLICY

Informing the Development of Policy in Alberta

Above:
Members of the research team working on ALI's irrigation project discuss water management policy with experts from government, stakeholder groups, and the research community.

Policy-makers must often develop complex legislation under tight time constraints, because their work is inevitably and necessarily influenced by both political considerations and the expectations of the electorate. Operating within the time-frame of an election cycle can greatly increase the challenges faced by both elected officials and civil servants, which is why research conducted by the Alberta Land Institute has proved highly valuable.

With its strictly impartial, objective, and academic mandate, the Institute's researchers take the time necessary to consider complex land management issues and policies, often examining them from the perspectives of numerous academic disciplines. These projects sometimes take multiple years, but once complete, can prove highly useful to legislators developing policy.

Over the past year, ALI has had great success in making research available to all levels of government, both by working directly with civil servants and elected officials, and by sharing information with stakeholders, the media, and the public. In the coming years, expanding direct relationships with policy-makers will continue to be one of the Institute's key objectives.

News Clippings

Though securing media attention is not one of ALI's strategic priorities, some of the Institute's work on land use issues has attracted the attention of the press over the past year. Select stories are noted below:

Canadian Press

Bill Graveland, "Alberta grazing leases keep $45M per year out of public hands, review finds." (January 18, 2016)

Western Producer

Barbara Duckworth, "Wetland preservation needs incentive support." (May 19, 2016)

Barbara Duckworth, "Few seek conservation protection." (May 26, 2016)

Barbara Duckworth, "Farmland swallowed by sprawl, but solution costly." (May 26, 2016)

Calgary Herald

Matt McClure, "Taxpayers missing out on $45M a year in surface rights fees, study says." (January 18, 2016)

Medicine Hat News

Alex McCuaig, "'Big problem' for government if grazing lease surface rights agreements change." (January 20, 2016)

Alex McCuaig, "Grazing leases a growing concern." (January 25, 2016)

Informing a Wetlands Research Strategy for Alberta

One of three strategic directions under the Alberta Wetland Policy calls for the development of "effective tools, knowledge and capacity" around wetlands. This means that some funds collected for the restoration of wetlands across the province can be redirected to support research, so the Government of Alberta is developing a Wetlands Research Strategy.

Redirecting funds away from restoration work to research cannot be done casually. A knowledge-based and impartial process must be put in place to evaluate what research areas should be explored, what criteria can be used to select projects, how those projects can be measured, and ultimately, how research can contribute to the objectives of the Wetland Policy.

In order to develop an effective and balanced approach, the government sought to engage with a wide array of experts and stakeholders from across the province. Because of its involvement in research related to the Alberta Wetland Policy, the Alberta Land Institute was asked to work in partnership with Alberta Innovates Bio Solutions and Alberta Innovates Technology Futures to facilitate this engagement process, and deliver recommendations that may shape the development of the strategy.

In April 2016, ALI hosted a special one-day workshop at the University of Alberta. With more than forty participants offering a variety of wetland expertise, the session examined ideas and priorities related to wetlands research. After the workshop, ALI produced a report reflecting the feedback of the attendees, and offering recommendations to the Government of Alberta about its Wetlands Research Strategy. Thanks to its reputation for impartial and objective research, ALI is increasingly being engaged by government, to help shape policy.

BUILDING CAPACITY

Creating Valuable Opportunities for Student Researchers

Above:
At Land Use 2016, Student Poster Competition judges Carol Bettac (Executive Director, AI Bio) and Kelly Hall (ALI Community Advisory Board) speak with University of Calgary student Evan Joyes about his research.

The Alberta Land Institute focuses on research questions that will have significant implications for the future of the province, and the world. From the development of ecosystem services to the consequences of different types of urban planning on land use, the issues considered by ALI's projects will be important for generations to come.

Recognizing these long-term policy implications, the Institute strives to provide opportunities for students to work on its projects. During each ALI call for proposals, one criteria for the assessment of applications is the ways in which the a potential project can contribute to 'building capacity' — how the research can help graduate students gain experience and expertise which will benefit them throughout their careers.

This emphasis on capacity building has already proved a great success. The Principle Investigators on all of ALI's projects are committed to providing opportunities for their students to participate in research, write and publish papers, and to present their findings at conferences. These students benefit from their experience, and in the process, serve as ambassadors for ALI's research around the world.

Our Students

Over the past year, ALI's research has benefited from the involvement of numerous students, including:

Post-Doctoral Fellow
Ali Ameli

PhD
Mohamed Ammar
Bijon Brown
Lynne Mbajiorgu
Kai Wang

Masters
Dareskedar Amsalu
Angela Bentley
Kaitlyn Cyr
Renee Howard
Marie-Ève Jean
Anna Kauffman
Lucas Novak
Saloni Salaria
Haoluan Wang
Anna Waz

Undergraduate
Kelly Bennett
Brent Dragon
Bryce Schmode

Establishing unprecedented research connections

Mohamed Ammar has spent the past year building a systems model that can simulate irrigated agriculture in Alberta. His model can project how different water availability, climate conditions, and policies could affect the production of specific crops for decades to come. Bijon Brown has developed an agent-based model which can simulate what decisions might be made by specific agricultural producers in irrigated areas, were a policy of water trading implemented.

These two models come from different disciplines which rarely interact — Mohamed is a PhD student in Civil and Environmental Engineering, Bijon is a PhD student in Resource Economics. They have been brought together as part of the research team on ALI's project Systems Modelling for Sustainability in Alberta's Irrigation Sector, and they are now attempting the unprecedented: to have a systems model and agent-based model interact.

Mohamed will use his systems model to provide a set of factors for Bijon's agent-based model, which will provide corresponding decisions. For instance, a hypothetical year might see decreased yields of certain crops, and a water shortage. Based on these factors, Bijon's model will simulate the decisions made by a farmer seeking to maximize production, such as use of water trades or a change in crop mix. These decisions will automatically flow back into Mohamed's systems model, which will simulate the consequences of those decisions. The resulting new factors will be returned to the agent-based model for more decisions, and so on. With every factor and decision being tracked for transparency, the simulation will be able to span decades.

By working together, Mohamed and Bijon are striving to increase the utility of their models, while setting new precedents in their disciplines.

ABOUT US

OUR STAFF

Vic Adamowicz
Research Director

Dave Poulton
Director

Steve Boyd
Director of Development

Susan Martin
Executive Assistant

Kenneth Tam
Communications Coordinator

CONTACT US

www.albertalandinstitute.ca
albertalandinstitute@ualberta.ca
780.492.3469

3-173 Centennial Centre for
Interdisciplinary Science
11455 Saskatchewan Drive
University of Alberta
Edmonton, AB, Canada
T6G 2E9

Welcoming Director Dave Poulton

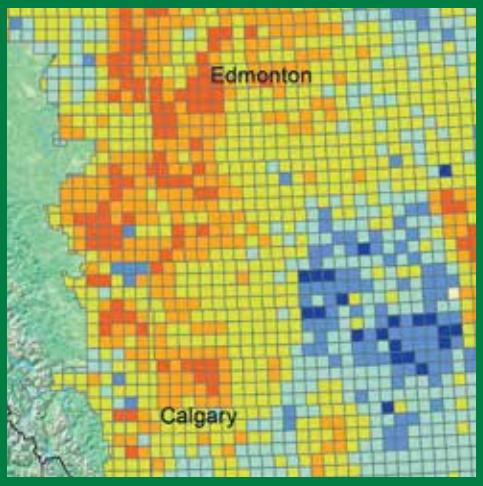
On June 1, 2016, Dave Poulton joined ALI in the new role of Director. An experienced consultant to organizations, businesses, and governments, Dave possesses a wealth of experience in promoting cross-sectoral collaboration. He is also an experienced researcher, with specific expertise in the areas of conservation offsets, market-based conservation, parks and protected areas, and land-use planning.

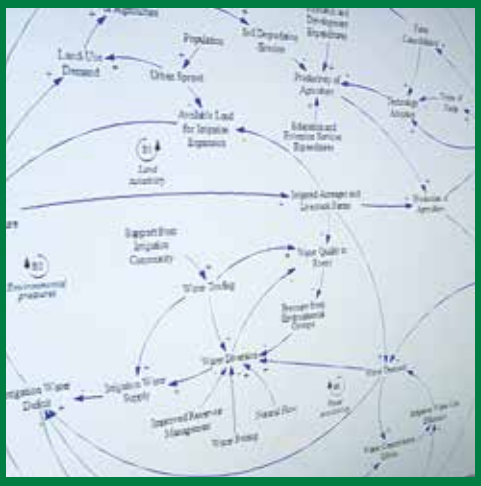
In the role of Director, Dave will help guide the development of ALI's ongoing strategy, while taking a lead role in outreach, and helping to further raise the Institute's profile across Alberta. He will inform and support ALI's research agenda, and help ensure that work completed by Institute researchers is shared with decision-makers and stakeholders throughout the province.

Dave is no stranger to the Alberta Land Institute; he is one of only two speakers to deliver presentations at both the 2014 and 2016 editions of ALI's Land Use Conference (the other was Peter Boxall, Principal Investigator on ALI's Alberta's Living Laboratories wetlands project). He has also built strong, long-standing relationships with many of ALI's researchers, staff, advisory board members, and partners.

In addition to his appointment with ALI, Dave will continue to serve as the Executive Director of the Alberta Association for Conservation Offsets and the Principal of Poulton Environmental Strategies. He is a member of the board of the Environmental Law Centre, was Executive Director of the Southern Alberta Chapter of the Canadian Parks and Wilderness Society from 2000-2008, and served as Conservation Director of that organization from 1999-2000.

Dave holds a Master of Laws degree in Natural Resources, Energy and Environment program at the University of Calgary Faculty of Law, as well as a B.A. and M.A. in political science from that institution. His LL.B. was completed at Dalhousie University in Halifax.





www.albertalandinstitute.ca