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About VACEA

The overall objective of VACEA is to improve the understanding of the vulnerability of rural agricultural and indigenous communities to shifts in climate variability and to the frequency and intensity of extreme climate events, and to engage governance institutions in Canada, Argentina, Brazil, Chile and Colombia in enhancing their adaptive capacity to reduce rural community vulnerability.

The interdisciplinary research program will have three major themes:

- 1) Regional Vulnerability Assessment,
- 2) Climate and Agro-Ecological Variability,
- 3) Integrative Risk Analysis.

Director's Message

We have reached the mid way point of the five-year VACEA research project. This is semi-annual newsletter #5. It includes profiles of two of our most active researchers: Margot Hurlbert, Associate Professor of Justice Studies and Sociology at the U of R, and Jessica Vanstone, PhD candidate in Geography at the U of R. Also in this newsletter you will find a student update and one of the research communities, Shaunavon, Saskatchewan, profiled. From the outset VACEA project, our aim has been to complete, by April 2014, the basic research on climate extremes and how they affect our selected Canadian communities. This will leave us with a full two years to share the research results with the communities, and with governance institutions, working with them to develop strategies for dealing with the impacts of climate variability and extreme events.

Beginning with a workshop in Crowsnest Pass, Alberta in September 2012, we've been developing a strategy for sharing our research results. Some of our project partners have been very much engaged in this process. Playing a major role in a Knowledge Dissemination Committee are Darrell Corkal from Agriculture and Agri-Food Canada (AAFC), Shannon Frank representing the Oldman Watershed Council and Arlene Unavos on behalf of the Swift Current Creek Watershed Stewards. Even though research results are just beginning to emerge, this committee felt that it was important to maintain contact with the communities and share preliminary results. So community outreach meetings were held this past winter in Swift Current on January 23, 2013 and on March 21 in Pincher Creek. This was an opportunity to share some preliminary results of the CVA and an analysis of historical climate extremes. Feedback from participating community members was based on their reaction to various graphics prepared for us by AAFC. Another stakeholder workshop is scheduled for November 6. The objective of this meeting in Lethbridge is to engage the local irrigation industry (producers and managers) in a structured discussion of the Economic Security of Irrigated Agriculture in the context of Climate Extremes & Climate Variability)

The international component of the VACEA projects involves collaborative and comparative research with our project co-investigators in Argentina, Brazil, Chile and Colombia. We will renew this effort with an important full project meeting in Puerto Varas in southern Chile during December 12-16. A large part of this meeting will be devoted to a strategy and mechanisms for integrating the research done by project investigators in the various regions and academic disciplines. The collaborative research includes the work of students. Daniel Agudelo Gomez and Camilo Naranjo Aristizabal, students from the National University of Colombia, spent this past April to July at the University of Regina. Daniel and Camilo were awarded scholarships from the Emerging Leaders in the Americas Program. Their studies at the U of R were supervised by VACEA researchers Joe Piwowar and Dave Sauchyn.

To our partners on the VACEA project, and the participants in the communities, I extend early wishes for safe and wonderful Christmas season and rewarding New Year. We look forward to working with you in 2014.

Dave

Graduate Student Update *By Erin Knuttila*

This article is a brief update on the work that several graduate students on the VACEA project have been doing with the interview data they collected last summer. Using a community-oriented approach, students conducted both community vulnerability assessments (CVAs) and governance assessments of the specific Canadian VACEA study sites. In February and March of 2012 both CVA and Governance interviews were conducted in Rush Lake, Saskatchewan as part of the assessment. Similarly, in May and the beginning of June interviews were conducted in Pincher Creek Alberta. During the end of June and into July the assessment continued in Shaunavon, Saskatchewan and finally in July 2012 interviews were completed in Taber/Lethbridge, Alberta. The Blood Tribe in Alberta is the final community that will be studied as a part of the Canadian portion of the VACEA project; however, appropriate methodological changes may be required in this First Nations community given the historical impacts of colonialism and marginalization.

The following chart shows the total number of interviews that were conducted in each community:

Community	Community Vulnerability Assessment (CVA) Interviews	Governance Assessment Interviews
Rush Lake	17	6
Shaunavon	34	18
Pincher Creek	33	20
Taber / Lethbridge	16	26
Blood Tribe	To be conducted	To be conducted
Total	100	70

The objective of the Community Vulnerability Assessment (CVA) has been to develop a systematic understanding of the present and past vulnerabilities of rural actors to extreme climate events. This has been done first by identifying some key informants in each community. These were considered to be people who are active within the community, including community organizers and leaders. We began by conducting individual interviews with these key informants and during the conclusion of each interview we asked them to suggest potential participants for further interviews. Sampling was done utilizing a snowball approach and we would often ask respondents to identify other potential participants representing a diversity of different viewpoints. Interviews started with semi-structured questions followed by open-ended interview questions. All interviews were transcribed, and the coding of interviews using NVivo software is almost complete. Coding the interview transcripts allows for further data analysis to draw out themes in participant responses.

The Governance Assessment interviews serve as an exploration of the network of actors, institutions, relationships, organizations and entities involved in managing water resources and responding to climate variability, hazards and extreme events in the selected communities. These interviews focused on organizational responsiveness and flexibility, how organizations plan for climate variability, existing organizational capacity, and the capacity of organizations to deal with future climate extremes. There are several levels of governance in the communities, so interviews included those involved in governance at the local and municipal level including stewardship groups, water Co-ops, NGOs, watershed organizations, irrigation districts, mayors, town administration, reeves, municipal councils and those involved in emergency responses. Similarly, at the provincial level those involved in water infrastructure were interviewed along with respondents from Alberta Agriculture and Rural Development, Alberta Environment, Alberta Wilderness, conservation officers, Saskatchewan Environment and the Government of Saskatchewan.

From both the CVA interviews and the governance interviews we have aimed to identify current and future vulnerabilities and adaptive strategies as a means of drawing conclusions about both vulnerability and resilience to climate extremes in the individual communities.

While data analysis is still underway some common themes are emerging from the coded interviews. In general, participants have attributed climate variability to three main causes: natural climate cycles, human activity and God. More specifically, in Rush lake there was a common concern among participants about the PFRA (Prairie Farm Rehabilitation Administration) divestiture. In Shaunavon one major concern was the lack of health care providers but there was a generally positive perception of the oil industry and their assistance in emergency response. In Pincher Creek respondents seemed divided on their opinions of industrial development in the area and there was a very high level of environmental awareness among respondents. Taber respondents spoke about the continuous improvement of irrigation technology in the area and how the drought of 2001-2002 led to local level cooperation on water related rights, such as the Water Sharing Act. The role of religion and strong individualism was thematic in the transcripts as well. In all communities some common adaptive practices used by participants to adapt to climate variability include crop diversification, minimum tillage, rotational grazing for water management and shifting their calving season. These general findings are very preliminary in nature. Once all interview transcripts are coded, a much more systematic data analysis will be undertaken using NVivo and we are looking forward to sharing more concrete findings.



VACEA student researchers at Crowsnest Pass.



Researcher Profile: Margot Hurlbert

Associate Professor Margot Hurlbert is a lawyer. Margot leads the governance assessment module within the VACEA project, which seeks to establish the contributions of governance institutions to the vulnerability and adaptive capacity of producers and communities in responding to extreme events of flood and drought. Margot has a B.Admin. (Great Distinction) from the University of Regina (1985), an LL.B. (Osgoode) (1987), and an LL.M. (Osgoode) (2005) in Constitutional Law with a focus on Aboriginal, natural resource, energy and environmental issues. Her research interests focus on environment, climate change, and water. Margot has published many papers, journal articles, and books on a broad range of environmental and justice topics.

Prior to embarking on a full time academic career, Margot practiced law in private practice for 12 years and in corporate practice as the Assistant General Counsel for SaskPower for seven years. As diverse as her publication list, her areas of practice included human rights, family, agriculture, criminal, bankruptcy, and banking law, as well as corporate commercial, privacy, and legislative drafting and policy.

Margot has worked on several other research projects in relation to water governance and climate governance including a SSHRC grant in relation to "Water governance and climate change: the engagement of civil society" and a SSHRC Insight Grant, "Facilitating Knowledge Mobilization at the Science/Policy Interface."

Student Profile: Jessica Vanstone

Jessica is currently working towards her PhD in Geography and Environmental Studies at the University of Regina. In 2006, Jessica received her BSc in Biology; a BSc Honours in Geography in 2007, and in 2012 completed her MSc in Geography, also from the University of Regina. Throughout her academic career thus far, Jessica has been employed as a Research Assistant at Prairie Adaptation Research Collaborative (PARC), under the supervision of Dr. David Sauchyn, where she has been involved in a number of projects concerning climate change and variability, water quantity and management, and the provision of resources for and integration with water managers, planners and decision makers. Jessica is also an employee under the Research Affiliate Program at Agriculture and Agri-Food Canada (AAFC), where she contributes to the study of historical and future climate variability and extremes. Jessica has a keen interest in the natural sciences and enjoys researching the hydroclimatic variability in the Prairies, with a focus on using tree-rings as a natural proxy for understanding the long-term historical climate, with a concentration on floods and droughts; as well as the larger atmospheric-climate forcings driving these events. Her doctoral research is focused on modeling the regional hydroclimate of the Canadian Prairies, for the purpose of improving the understanding of the shifts in climate variability and the frequency and intensity of extreme climate events. Jessica's research will contribute not only to the historical understanding of climate variability, but also to the development of plausible future climate scenarios, providing valuable information regarding climate change impacts and adaptation for the Prairie Provinces..



VACEA Community Profile: Shaunavon, SK

By Amber Fletcher

The town of Shaunavon is located in southwestern Saskatchewan at the southern edge of the Swift Current Creek Watershed. The community has a population of approximately 1,756 – a number that continues to grow due to increasing economic activity in the area. Shaunavon is located in an area known as the Dry Belt, at the heart of the semi-arid region known as Palliser's Triangle. The area is known for its history of extreme, prolonged drought.

The town was founded when the Canadian Pacific Railway company purchased the town site in 1912. A period of settlement followed and Shaunavon's population boomed to 700 by 1914; to this day, the community is known as "Boomtown". Today, Shaunavon maintains its agricultural roots but has experienced strong economic growth due to oil extraction in the area. The town now contains over 100 commercial services for household, agriculture, and oilfield purposes and is a key commercial area in southwest Saskatchewan.

In the spring and summer of 2012, a team of four graduate students lived in the Shaunavon area for several weeks and interviewed a large portion of community members for the VACEA project. The goal of these interviews was to understand how rural communities are affected by climate extremes, such as flood and drought, and to identify the most effective ways for individuals, communities, and governments to respond to these extreme events.

Over generations, Shaunavon-area farmers and ranchers have adapted to the drought-prone conditions and have become very resilient. Participants clearly remembered some of the most severe weather events in their area over the past century, recalling droughts in the 1930s, 1960s, 1980s, and mid-2000s. Several of our interview

participants recalled the extreme agricultural droughts of the 1930s from their childhood: one participant remembered thick dust clouds caused by soil erosion, which forced him to walk home from school moving hand-over-hand along a barbed wire fence to avoid getting lost. Another participant remembered using wet towels to block cracks in windows and doors to prevent the blowing dust from entering her childhood home. More recently, producers had coped with shortages of hay for cattle, dramatic crop losses, and grasshopper scourges associated with very dry conditions. Grass fires are also a threat in dry years.

Many farmers had relied on crop insurance to cope with drought. However, since drought has a slower onset than a flood or fire, some participants felt that drought was less likely to catch the timely attention of governments, making government programming a less reliable support in the minds of some. While some ranchers had purchased feed from elsewhere, transporting hay can be expensive and some found it more sensible to graze their cattle in wetter parts of the prairies, relying on the help of friends or paid arrangements in those locations. Indeed, social networks were a defining feature of the Shaunavon area. Neighbourly relationships were often a key source of help during crisis. Although emergency services were available, many relied on the good will of neighbours to assist with grass fires. The oil industry was seen as a helpful resource during emergencies, as were Hutterian colonies. Some producers stored water tanks on their farms for emergencies and many neighbours would come out with shovels or other equipment to help fight a spreading fire.

Fortunately for many Shaunavon residents, the area surrounding the town is located on an important aquifer that provides a high quality and abundant source of water for the town and many producers nearby. Producers with ranches on the aquifer were rarely concerned about water.



The Swift Current Creek Watershed, Photo courtesy of Bruno Hernani

In some cases, however, water was the cause of problems. Unlike those in the neighbouring community of Eastend, which is located along the Frenchman River, Shaunavon's location means residents are unlikely to experience flooding from creeks or rivers. The rolling topography of the area means that hilltop portions of fields are protected from the worst flooding. However, in recent years (particularly in 2010 and 2011), producers in the Shaunavon area experienced an unusually high level of precipitation for such a dry area. Although still less of a concern than drought overall, flooding brings unexpected challenges such as crop diseases. Some farmers felt less control over flood conditions than drought. Whereas they had learned to adapt to drought and knew how to hold moisture in the soil, there was little they could do about extreme precipitation. As one producer put it, "Nobody knew – down here anyway – how to seed in wet. We had never experienced that before." Municipal governments also found extreme precipitation challenging and costly as roads and infrastructure were washed out.

For others, the main problem was rapid fluctuation between dry and wet in the same season – a dry spring followed by an excessively wet late summer or autumn was extremely difficult for farmers. Extreme winter precipitation had also been a problem for many cattle producers. Some had lost calves during blizzards.

The combination of climate extremes with economic problems can create vulnerabilities for households and communities. Farmers expressed concern about the growing cost of inputs and implements, which led to higher debt levels. Several participants felt that larger and younger farmers – or any farm with high debt – would be most vulnerable to a flood or drought. Some participants had taken additional employment off the farm or ranch to provide financial assistance or security for the farm. Almost everyone we interviewed saw the oil industry as beneficial for the community, as it provided jobs or extra income for farmers with oil wells on their land.

Although informal social networks are strong in the Shaunavon area, residents are concerned about a lack of formal medical services. The town has a shortage of doctors. The hospital has had to limit its hours and is at times unable to provide emergency medical services. Most participants saw this as a distinctly rural problem, citing the difficulty of retaining doctors in small towns. In addition, despite the growth of Shaunavon itself, many farm families were concerned about the declining farm population in the surrounding area. Although this trend – known as depopulation – has many causes, there is a climate dimension. Many participants spoke about the weather uncertainty that is an inherent part of farming. The high cost of land and inputs to begin farming or ranching, the strong knowledge base required to do the work, a lack of public understanding and respect for what farmers do, and the uncertainty of a regular profit can make a career in farming challenging.



Storm brewing in the Swift Current Creek Watershed, Photo courtesy of Bruno Hernani

Despite these challenges, participants in the Shaunavon area used both traditional knowledge and new, innovative ways to farm and ranch successfully. Many were using zero-till practices and carefully planned rotation to preserve soil moisture and quality. Farmers and ranchers promoted the use of shelterbelts and many had planted trees. Ranchers were interested in preserving the quality of local creeks and water sources through fencing or solar pumps. These practices represent more than short-term responses to extreme climate events. Producers in the Shaunavon area are engaging in long-term planning to increase their resilience in the face of future flood and drought. A key goal of the VACEA project is to provide information and resources to help communities like Shaunavon adapt and prepare for climate events into the future.

Get more information about the project on the VACEA website: www.parc.ca/vacea

and stay connected at our new facebook page:
www.facebook.com/pages/Vulnerability-and-Adaptation-to-Climate-Extremes-in-the-Americas-VACEA/271211079611742

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