



Ag-Water Forum III

Agricultural Adaptation to Climate Change



REPORT
for
PRAIRIE FARM REHABILITATION ADMINISTRATION AND ENVIRONMENT (PFRA&E)

Saskatoon
March 17-18, 2009

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ACKNOWLEDGEMENTS

Thank you to the many organizations who actively participated with commitment and dedication on the Ag-Water Forum III Planning Committee.

AAFC-PFRA&E

Environment Canada

Natural Resources Canada (NRCan)

Saskatchewan Watershed Authority

Manitoba Water Stewardship

BC Agriculture and Lands

Alberta Agriculture and Rural Development

Department of Fisheries and Oceans

Table of Contents

A. Forum Objectives.....	4
B. Setting the Context.....	4
C. KEYNOTE ADDRESSES.....	5
Ag Water Resources: State of Climate Change Impacts and Adaptation, Knowledge and Capacity in Australia	5
Ag Water Resources: State of Climate Change Impacts and Adaptation, Knowledge and Capacity in Canada.....	5
Farm Economy and Climate Change	5
AAFC - New Directions in the Environment	6
AgWater Research and Innovation – BC Okanagan Model	6
AAFC Supported Ag-Water Climate Change Adaptation Activities including Drought preparedness, LIRA and Canada DRI	6
Intergovernmental Panel on Climate Change: Perspectives on Adaptation Related to Water and Agriculture.....	6
D. Provincial Presentations	7
ALBERTA: Irrigation Agriculture: Where are we today and are we prepared for tomorrow?	7
ONTARIO: Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) Mandate // Vision and Mission	7
BRITISH COLUMBIA: Ag-Water and Climate Change Issues in British Columbia	7
NEWFOUNDLAND-LABRADOR: Agricultural Water Management for Adaptation to Climate Change in Newfoundland and Labrador	8
MANITOBA: Climate Change Adaptation Approaches for Agriculture	8
NOVA SCOTIA: The Nova Scotia Perspective	8
SASKATCHEWAN: Saskatchewan Adaptation Initiatives to Climate Change	8
NOVA SCOTIA : Ecological Goods & Services in Nova Scotia.....	9
Summation and Discussion on Provincial Presentations.....	9
Questions to Provincial Presenters:.....	9
E. Federal Presentations – Irrigation Agriculture: Where are we today and are we prepared for tomorrow?	10
Agriculture and Agri Food Canada (AAFC): Irrigation Agriculture: Where are we today and are we prepared for tomorrow?.....	10
Environment Canada: Vulnerability of Ag Water to Climate Change	11
Health Canada: Climate Change and Extreme Weather Events – Protecting the Health of Vulnerable Canadians	11
Natural Resources Canada (NRCan): Water and Climate Change at Natural Resources Canada	11
Questions to Federal Presenters:.....	11
F. Panel 1 – Discussion on Climate Change Impacts on Agriculture’s Water Supply – Understanding Ag Vulnerabilities to Climate-induced Water Stress.....	12
Quebec Ministry of Agriculture	12
Western Water Stewardship Council	12

Environment Canada Science and Research in Hydrometeorology and Water Cycle Prediction – Research and Operation Products, Potential for the Agricultural Water Sector	12
PARC.....	13
Overview of Agricultural Adaptation to Climate Change in Atlantic Canada	13
Questions to Presenters of Panel 1:	13
G. Panel 2 – Discussion on Adapting to Extreme Events: floods, droughts, storms caused by climate change and climate variability	13
Environment Canada	14
Regional Capacity: The Water Wolf Project.....	14
Adapting to Extreme Events	14
Preparing for Extreme Climatic Events: How do we improve?.....	14
Extreme Event: Adaptation by the Irrigation Sector	14
Questions to Presenters of Panel 2:	14
Forum Summation and Next Steps.....	15
H. COMMONALITIES.....	16
Appendix A – Conference Presenters / Speakers	17
Appendix B – Workshop Participants	19
Appendix C – Workshop Agenda	22

A. FORUM OBJECTIVES

Objectives of the two day forum:

- Improve understanding of impacts of climate change on ag-water (quantity and quality) and adaptation approaches for agriculture
- Create networking opportunities between provinces and federal departments in water, agriculture and climate change related activities
- Foster collaboration between federal and provincial departments on ag-water and climate change initiatives that lead to adaptation to climate variability in agriculture

Following is a summary report from this forum. The report is intended as a record of the proceedings and will be used by the Prairie Farm Rehabilitation Administration and Environment (PFRA&E) and their partners to inform future work on climate change adaptation.

B. SETTING THE CONTEXT

Opening Remarks

Gord Bell, Chair, Ag-Water Forum III Planning Committee

This forum was organized by the Prairie Farm Rehabilitation Administration and Environment (PFRA&E), a branch of Agriculture and Agri-Food Canada (AAFC). Since 1935, PFRA&E has been working locally, nationally, and internationally toward ensuring healthy and productive agricultural landscapes across Canada by providing expertise and services to producers and stakeholders for the sustainable use of agricultural land and water resources.

This was the third national ag-water forum hosted by Agriculture and Agri-Food Canada. The first was held in Ottawa in April 2005 with the theme of *Integrated Water Resource Management*. The second forum was held in Winnipeg in February 2007 and dealt with *Source Water Protection*. The intent of this forum was to build on the successes of those past two forums.

The objectives of the forum addressed climate change as it relates to agriculture and ag-water, activities underway across the country, and collaborations and collaborative opportunities between government, associations, industry and producers. It is hoped that in the pursuit of achieving the forum objectives, participants had opportunities to learn from each others' experiences, network for the creation of new partnerships, and support existing partnerships while fostering cooperation between government departments opening doors for collaboration.

What do climate change and the need to adapt to climate change mean? To understand this better the following definition helped to set the tone of this forum.

"Climate change adaptation involves making adjustments in our decisions, activities and thinking in response to observed or expected change in climate with the goal of moderating harm and taking advantage of new opportunities that may be presented in these changes." NRCan
(http://adaptation.nrcan.gc.ca/101/adapt_e.php)

This forum highlighted moderating harm and taking advantage of new opportunities. In the past we have not put the

same priority on identifying opportunities as we have on identifying harm. This is something we should focus on more in the future. Further:

“Regions across Canada face a range of adaptation issues – many of which are complex, involve many parties, and include technical, socio-economic, and environmental considerations and trade-offs. The capacity and readiness to take action to adapt also vary from one region to another.” NRCan (http://www.adaptation.nrcan.gc.ca/collab/index_e.php)

Regional variation was discussed on the first day of the forum with the provincial presentations.

PowerPoint presentations, in both French and English, and a report of the forum will be available on a PFRA&E ftp site provided to presenters and participants.

C. KEYNOTE ADDRESSES

AG WATER RESOURCES: STATE OF CLIMATE CHANGE IMPACTS AND ADAPTATION, KNOWLEDGE AND CAPACITY IN AUSTRALIA
Andrew Johnson, Director, Strategic Policy for Department of Water, Land and Biodiversity Conservation

Mr. Johnson provided an overview of what has been happening in Australia recently, including the challenges faced by the people of Australia ranging from the extremes of drought and bush fires in the south to flooding in the north. The government of Australia has spent two decades working in a proactive way, using a forward-thinking approach to prepare for adapting to continued extremes in temperature and water availability, quality, and quantity. Studying specific experiences such as the Murray Darling Basin Project has provided valuable insight into mechanisms needed to address the situation and had helped determine what type of resources will be required in the future.

AG WATER RESOURCES: STATE OF CLIMATE CHANGE IMPACTS AND ADAPTATION, KNOWLEDGE AND CAPACITY IN CANADA
Dr. Henry Venema, Director, Sustainable Natural Resources Management, International Institute for Sustainable Development (IISD)

Dr. Venema provided an overview of the IISD including work being done in a primary focus of prairie ag-water. He spoke about the importance of utilizing existing reports from various agencies in conjunction with information from on-farm producers and how that can help us to understand cumulative impacts of climate change and its effect on ecosystems. C-CIARN and NRCan were important resources funding agricultural research. Positive opportunities can be achieved if the preparation to manage water supplies is done now. Regional Adaptation Collaboratives is a new program from NRCan that replaces C-CIARN. Growing Forward: Ag Policy Framework is a foundation program that will replace the current Agricultural Policy Framework agreement between the federal Agriculture department and the provincial/territorial agriculture departments.

FARM ECONOMY AND CLIMATE CHANGE

Don McCabe, Co-Chair of Environment and Science Committee, Canadian Federation of Agriculture

Mr. McCabe provided an overview of what's coming out of the farm gate, challenges of the market and importance of policy and policy impact to the producers. Providing opportunities for everyone to equally participate in finding solutions that work for everyone is an important approach that should be used. Research and science is needed now to move ahead in making decisions for tomorrow, but the scientists have to speak with the farmers. Long term impacts of climate change on the farm crop can be turned into positive opportunities if the infrastructure is in place.

AAFC - NEW DIRECTIONS IN THE ENVIRONMENT

Jamshed Merchant, Asst. Deputy Minister, PFRA & Environment, Agriculture and Agri-Food Canada (AAFC)

Mr. Merchant covered three areas including:

- Objectives and overview of the new program "Growing Forward", the next generation of programs that will replace the current Agricultural Policy Framework agreement between the federal Agriculture department and the provincial/territorial agriculture departments;
- Ecological Goods & Services;
- the PFRA and Environment branch of AAFC.

Moving forward into the future is a concerted effort that takes everyone working together. Environmental concerns and impacts from such things as climate change can be better understood through continued research.

AGWATER RESEARCH AND INNOVATION – BC OKANAGAN MODEL

Dr. Denise Neilsen, Research Scientist, Agriculture and Agri-Food Canada (AAFC)

Dr. Neilsen spoke about the Water Demand Modeling System being used in the Okanagan Basin. The collaborative project between AAFC and the BC Ministry of Agriculture and Land was created in response to past water shortages and an increased demand on the water supply in the Okanagan region. This area has the lowest per capita availability of fresh water in Canada and is an ideal 'living laboratory' to study for ways to improve water management and water allocation. Statistical information gathered has contributed to residents in the Basin having a more accurate understanding of their current and future water needs, water availability, and has identified necessary actions needed to ensure a continued water supply especially for agriculture.

AAFC SUPPORTED AG-WATER CLIMATE CHANGE ADAPTATION ACTIVITIES INCLUDING DROUGHT PREPAREDNESS, LIRA AND CANADA DRI

Dr. Harvey Hill, Agriculture and Agri Food Canada (AAFC)

Dr. Hill presented on how climactic issues can and should be integrated into the decision-making process. Informing decision makers as to what the coping range is for probabilistic risk, how it is changing over time, and how it has changed over time can help mitigate future water pressures and aid in determining crop viability.

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: PERSPECTIVES ON ADAPTATION RELATED TO WATER AND AGRICULTURE

Linda Mortsch, Senior Impacts and Adaptation Researcher, Environment Canada

Linda Mortsch provided an overview of IPCC responsibilities, activities, reporting processes and impacts of their statements on a global scale. By focusing on some points from IPCC Fourth Assessment Reports including the Physical Science Basis, and Impacts, Adaptation and Vulnerability, as well as the Technical Report on Climate Change and Water, key ideas relevant to dealing with issues related to climate change and its impact on water were put forward. Alterations in the distribution, amount, timing and/or quality of water and increases in demand due to a changing climate are likely to make water management more complex and challenging. In order to reduce vulnerability, the development of adaptation measures for future needs cannot be based only on past climate and hydrologic experiences but will have to include projections of future conditions as well.

D. PROVINCIAL PRESENTATIONS

Questions for the provincial presenters to consider:

1. What is the major climate change stress, vulnerabilities related to agricultural water both quality and quantity in your province?
2. What policies, programs, management approaches or steps are being taken to adapt to potential climate change impacts to ag-water?
3. Focus in on one or two programs or initiatives. What progress has been made? What is perceived? What are the challenges? What are the gaps?

ALBERTA: IRRIGATION AGRICULTURE: WHERE ARE WE TODAY AND ARE WE PREPARED FOR TOMORROW?

Bob Riewe, Alberta Ag & Rural Development

Background information was provided on the source of southern Alberta's water and the percentage consumed by irrigation districts. A history of water needs for agriculture, irrigation issues and past programs provided context for the establishment of current programs including the rehabilitation of infrastructure and improved irrigation systems. Improving on their method of water distribution has had a positive effect on the water resource through accrued water savings. Options for water allocation to accommodate future water needs must be further studied to find the most beneficial means to ensure sufficient water continues to be available for agriculture. The supply side of irrigation water resources needs to be better understood.

ONTARIO: ONTARIO MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS (OMAFRA) MANDATE // VISION AND MISSION

Jim Richardson, Director, Ontario Ministry of Agriculture, Food and Rural Affairs, Environmental Management Branch

Mr. Richardson provided an overview of the OMAFRA role in current approaches to adaptation and future direction in water management while simultaneously protecting the Ontario's natural environment. OMAFRA's role is building opportunity to collaborate, influence, engage and deliver programs that will aid in the sharing of knowledge and expertise in an effort to adapt to climate change and its impact on the agricultural sector of Ontario. An integrated water management strategy driven by several seasons of unpredictable precipitation has enhanced environmental performance and competitiveness while reducing the danger of future water shortages. Case studies have identified risks and opportunities and have provided a better understanding of what is needed to prepare for the province's agricultural future.

BRITISH COLUMBIA: AG-WATER AND CLIMATE CHANGE ISSUES IN BRITISH COLUMBIA

Doug Edwards, Regional Water Resources Engineer, PFRA & E, AAFC

Mr. Edwards provided an overview of the BC regions and their agricultural activities, water sources and issues related to regulations and restrictions as they relate to agricultural activity. The diversity of soil types and climates supports a wide range of agricultural activities. There is visible indication of the impact climate change is having on the various regions of the province presenting challenges in understanding what that impact means for the future of farming in BC. Initiatives such as the formation of the Climate Action Secretariat collaboration involves government, industry and academia working together to develop strategies to address climate change and its impact on the future of BC.

NEWFOUNDLAND-LABRADOR: AGRICULTURAL WATER MANAGEMENT FOR ADAPTATION TO CLIMATE CHANGE IN NEWFOUNDLAND AND LABRADOR

Dr. A.K. Abdel-Razek, Newfoundland and Labrador Department of Environment and Conservation

Dr. Abdel-Razek presented statistical information on ag water use nationally and provincially. Observations on Climate change and its possible impact on agriculture in the province were presented. Examples of policies, initiatives and studies set the stage for acquiring knowledge on how to adapt to climate change. The province has given higher priority for ag-water use in its comprehensive water use allocation system. Studies have included producers in research to better identify and understand agricultural usage amounts. Sharing the results of initiatives and studies with ag-water users/producers has promoted the understanding, efficient utilization, conservation and appreciation of the value of water resources; value other than monetary. In agricultural adaptation to climate change, the presentation emphasized that ag-water users/producers and water resource managers have to be fully aware and promote the sustainability and security of water resources which must be: i) efficiently utilized, ii) willingly conserved, and iii) value appreciated. Partnerships and continued research funding that are specific to ag-water is imperative to continue moving forward in preparing for the impacts of climate change on the future of agriculture.

MANITOBA: CLIMATE CHANGE ADAPTATION APPROACHES FOR AGRICULTURE

Dr. Rhonda McDougal, Director of Planning and Coordination, Manitoba Water Stewardship

Dr. McDougal provided an overview of Manitoba's current climate change adaptation approaches for agriculture and water. She described the roles of the Climate and Green Initiatives Branch; Manitoba Water Stewardship; Manitoba Agriculture, Food and Rural Initiatives; and PFRA Manitoba Region and how they are developing an "informal community of practice" among their organizations. New initiatives with a climate change focus in Manitoba include the Sustainable Agriculture Practices Program and the Wetland Restoration Incentive Program. Manitoba Water Stewardship is taking a holistic approach to adaptation by bringing science, policy and individuals together through their Integrated Watershed Management Planning process. Integrated watershed planning provides resilience through healthy ecosystems and through the development of community knowledge and capacity. Participation in many working groups locally and nationally allows for pooling and accessing a wide variety of expertise and resources. Provincial commitment to climate change adaptation initiatives is ongoing.

NOVA SCOTIA: THE NOVA SCOTIA PERSPECTIVE

Lynda Weatherby, Nova Scotia Environmental Farm Plan Coordinator, Nova Scotia Federation of Agriculture

Ms. Weatherby presented on predictions that may affect Nova Scotia agriculture and climate change, the kind of policies and legislation Nova Scotia has in place and is developing that may help facilitate adapting into the future. Historical information was provided on the practice of using dykes for marshland protection against sea level rise. Legislation has been established to protect marshlands, ag lands, and both surface and ground water. More work and funding is needed to facilitate adaptation to changing weather patterns and their affects.

SASKATCHEWAN: SASKATCHEWAN ADAPTATION INITIATIVES TO CLIMATE CHANGE

Wayne Dybvig, Vice President, Saskatchewan Watershed Authority

Mr. Dybvig provided an overview of the partners involved in the climate change and the ag water issues in Saskatchewan. Weather variability and extremes in precipitation have always been a part of the prairie landscape and ag response to

extreme temperatures has been ongoing since the 1930s when the PFRA was established. Improved farming, soil conservation and water efficient techniques have made a positive impact on sustainability but more information is needed. Understanding the impacts of climate change is still in its infancy and interpretation is highly variable. Studies and initiatives have aided in bringing to everyone's attention the need for water conservation and implementation of best management practices in the agricultural sector. Assessing water demand issues remain a focus for future initiatives. A provincial drought strategy is needed. Continued partnerships with federal and provincial agencies are important for further research and development.

NOVA SCOTIA : ECOLOGICAL GOODS & SERVICES IN NOVA SCOTIA

Edna Foster, Nova Scotia Federation of Agriculture

Mrs. Foster gave an overview of the history of the Nova Scotia Federation of Agriculture which has represented Nova Scotia agricultural community for more than a century with a goal of ensuring a future that is financially viable, ecologically sound and socially responsible. They use a three-pillar industry transition model to provide the province with economic and social prosperity. Studies and initiatives funded by various agencies have produced important information that has resulted in policy to support the continuation of a healthy agricultural environment.

SUMMATION AND DISCUSSION ON PROVINCIAL PRESENTATIONS

Darrell Corkal, Moderator

One of the benefits created by the AAFC ag-water forums is the opportunity to get together with different federal and provincial counterparts to share information on issues that do have some overlapping jurisdiction; this is perhaps one of the biggest challenges in Canada. Presentations have been made on a variety of great activities underway across the country. Common themes are building a community's practice; trying to establish a clearer policy to guide markets; the need to get more information out not just so that governments can use it but so that decision makers can make better local decisions; the notion of conservation and efficient water use; and helping to manage our water resources at an integrated fashion at the local level – integrated water management and local decision making. These are noble aspirations and all very challenging to address.

QUESTIONS TO PROVINCIAL PRESENTERS:

- Ecological Goods & Services: asking if anyone is implementing this system. Some provinces are implementing some type of EG&S programs; other provinces are in the pilot stage, or are looking at opportunities to implement this type of program. Evaluations are still being done on the program effectiveness.
- Is anyone involved in soft path future scenarios and back casting and what are the challenges? Yes, soft path and back casting approaches are fairly new but being implemented in several provinces. Many of the watershed activities are being conducted with local citizen engagement which is in the direction of soft path as well. This work connects to the question of how to empower local decision-making in a truly consultative way.
- What are the current barriers in Canadian public policy development to the actual implementation of a fully funded large scale landscape conservation incentive program for agriculture? Barriers include: public willingness to pay which results from convincing the public of the importance and value of this type of program; educating the public on this concept is needed; underestimation of the level of public interest and support of these types of programs.
- What are some of the research and technical resources presenters would like to see developed over the next five years to help them position ag water and water management? Resources include: specific ag-water funding for further research and studies and passing on tools to the farmers to equip them to adapt to the change; funding translated to resources translated to more research and tools in the hands of the farmers; accessibility to and scale of

info needed - both local groups and farmers are not able to use the technical models and data because of specialized language; an information clearing house that allows individuals to start educating themselves.

- How do you include the aboriginal communities in the IWRM process? Some initiatives involve Aboriginal groups and have been successful. Other provinces find a challenge in cultural differences, timelines, funding to participate in a larger way in the consultative process.
- Given the jurisdictional issues how will challenges with water allocation be addressed when dealing with one or more provinces? Many questions regarding moving/distributing water need to be addressed. Water use allocation systems for agriculture do not exist and the current water trading framework does not have a priority use of water. However, Newfoundland and Labrador has a comprehensive water use allocation system that gives higher priority for agriculture water use. People also need to understand their water rights in regard to access and use of water on their property. Some Inter-provincial Water Boards have been established, inter-provincial water resources agreements have also been implemented. More work and research is needed.
- Would presentation tools like those used at this forum be helpful in getting the information across to the producers? It may prove a point but it may not be convincing in regard to future climate change impacts. When talking to producers, information needs to be very pragmatic and current.

E. FEDERAL PRESENTATIONS – IRRIGATION AGRICULTURE: WHERE ARE WE TODAY AND ARE WE PREPARED FOR TOMORROW?

Questions for federal presenters:

1. Focussing on one or two programs or initiatives, what progress has been made to address the vulnerability of agricultural water to climate change?
2. What is perceived to work?
3. What are the challenges?
4. What are the gaps?

AGRICULTURE AND AGRI FOOD CANADA (AAFC): IRRIGATION AGRICULTURE: WHERE ARE WE TODAY AND ARE WE PREPARED FOR TOMORROW?

Dr. Irene Hanuta, Senior Policy Analyst, Strategic Planning Division, PFRA &E, AAFC

Dr. Hanuta provided details on current initiatives related to water and climate change impacts and adaptation. She noted that Federal inter-departmental and cross-branch discussions are currently underway to examine how to better work together on these issues on a national scale. There is a lot of commonality across Canada even with regional differences and priorities. With a changing climate, Canada will likely gain new opportunities along with challenges. It is important that AAFC consider national, regional and local impacts and also how the sector will manage internationally as the climate changes. Programs and funding will be needed for research and development, and preparing for future adaptation. AAFC will continue to work with partners to help the sector and build on the successes already achieved and to take advantage of emerging opportunities to remain sustainable and competitive.

ENVIRONMENT CANADA: VULNERABILITY OF AG WATER TO CLIMATE CHANGE

Dr. Charles Lin, Director General, Environment Canada

Dr. Lin provided an overview of the research projects Environment Canada has undertaken focusing on the common theme of climate change and water. From analysis of data from observations and climate models, important information on for example, river flows, temperature change and the attribution of human influence on the climate system can be inferred. Climate models also provide projections of changes in the future. Statistical downscaling is being applied to observed and model data to arrive at sufficiently fine space scales that are appropriate for impacts and adaptation studies on a local level. Continued research to support decision making is needed.

HEALTH CANADA: CLIMATE CHANGE AND EXTREME WEATHER EVENTS – PROTECTING THE HEALTH OF VULNERABLE CANADIANS

Kaila-Lee Clarke, Policy and Research Analyst, Climate Change and Health Division, Health Canada

Ms. Clarke presented on the human face to climate change and water issues focusing on extreme weather events and water borne diseases. Health risks on vulnerable groups to extreme weather events and subsequent stresses present the need for emergency preparedness to address the impact on human health. Initiatives in other countries have provided valuable information on what preparation may be needed to cope with extreme climate changes in both urban and rural communities.

NATURAL RESOURCES CANADA (NRCAN): WATER AND CLIMATE CHANGE AT NATURAL RESOURCES CANADA

Dr. David Boerner, Director General, Central and Northern Canada Branch, Geological Survey of Canada

Dr. Boerner provided an insight of ongoing initiatives underway at NRCan including lessons learned. A horizontal task team approach has been established to focus efforts on a holistic understanding of NRCan water activities in the context of risk management. Identification of end-to-end solutions are needed to ensure all can adapt. Policy development is being viewed and developed by trying to consider every angle that affects the issue. Moving forward means taking action now based on existing knowledge; research needs should be addressed, but not delay action. New initiatives will utilize an integrated approach to moving forward.

QUESTIONS TO FEDERAL PRESENTERS:

Several questions posed to the panellists included:

- Who is monitoring runoff from cities and urban facilities and are the findings being made public? Environment Canada is doing some of this. Some cities are doing their own monitoring and information is available.
- Are there problems with infectious diseases being identified and is there an anticipation that major tropical diseases may move north? It is a concern and several are being monitored by Canadian researchers. There is a relationship between climate and infectious diseases which are not always evident but the tropical diseases are not anticipated to become an issue. Risks are being considered and monitored but currently all cases are being experienced by individuals who have travelled.
- What is Health Canada's forecast past 2050? The modeling in the presentation used was done by Environment Canada and indicate that temperatures will continue to climb and so will the affect on human health. Environment Canada and Health Canada are working to enlarge the range of the forecast.
- Do you see an Apollo project undertaken to really understand the groundwater and key needs for water that will increase our resiliency during long-term droughts in the future? Groundwater is complex and our current understanding in Canada is incomplete, but it can certainly be a critical resource during prolonged drought. However,

if information is not available to understand the groundwater (which can recharge quite slowly), overuse could be a serious consequence. Understanding the impact of contaminants on groundwater supplies is also being researched and better understood.

F. PANEL 1 – DISCUSSION ON CLIMATE CHANGE IMPACTS ON AGRICULTURE’S WATER SUPPLY – UNDERSTANDING AG VULNERABILITIES TO CLIMATE-INDUCED WATER STRESS

These presentations were geared to an overview of the Ag Sector’s key vulnerabilities to climate-induced water stress. Vulnerabilities include social, economic, and environmental vulnerabilities (e.g. rural economies, communities).

What are the present Ag vulnerabilities to climate stress? How is the Ag community in coping with present vulnerabilities? What are some future climate scenarios? How might future climate scenarios affect agriculture and future vulnerabilities? Are there trends or signals to how the Ag Sector and Ag Communities are coping with current climate-induced stress? What successful adaptations have occurred in the past? How are you working together to address current vulnerabilities? Are there gaps?

QUEBEC MINISTRY OF AGRICULTURE

Vincent Moffet, Ministère de l’Agriculture, des Pêcheries et de l’Alimentation du Québec (MAPAQ)

Mr. Moffet spoke about the question of ag-water quality. In Québec, public concern led to the establishment of a water policy. The agricultural sector has recognized that water is a collective heritage and that a voluntary and collaborative approach is, among other measures, needed to ensure water quality. Government departments, producer representatives, and regional organizations have joined forces to take action to improve water quality, which will also help reduce vulnerability to anticipated climate change stresses on water supply.

WESTERN WATER STEWARDSHIP COUNCIL

Wayne Dybvig, Vice President, Saskatchewan Watershed Authority

Mr. Dybvig presented information on the new institutional arrangements established. He gave an overview of the WWSC purpose and responsibility with regard to water conservation. WWSC recognizes water conservation is a common issue and information should be shared for the benefit of all people. The benefits of working together on the development of short and long term initiatives on these issues and elimination of duplication/redundancy were stressed.

ENVIRONMENT CANADA SCIENCE AND RESEARCH IN HYDROMETEOROLOGY AND WATER CYCLE PREDICTION – RESEARCH AND OPERATION PRODUCTS, POTENTIAL FOR THE AGRICULTURAL WATER SECTOR

Al Pietroniro, A/Director, Water Survey of Canada, Environment Canada

Mr. Pietroniro presented on the Environment Canada prediction system and put it in an agricultural context. The system is a numerical weather model which predicts what happens in the atmosphere for up to twenty days. Studies are being used to determine whether these types of products would be useful tools. The focus of these products will be to do a statistical downscaling approach to identify climate change impacts and glacial melt. Another focus is on water cycle prediction and water development to identify the total amount of water that is used.

PARC

Dr. Dave Sauchyn, Research Coordinator, Prairie Adaptive Research Centre

Dr. Sauchyn provided information on adaptations to water shortages in Hanna, Alberta during the 2001-02 drought. Six communities were part of a study looking at adaptation in Alberta and Saskatchewan to climate change. Key findings concluded that adaptation to climate change is good sustainable economic development.

OVERVIEW OF AGRICULTURAL ADAPTATION TO CLIMATE CHANGE IN ATLANTIC CANADA

Dr. A.K. Abdel-Razek, Newfoundland and Labrador Department of Environment and Conservation

Dr. Abdel-Razek provided an overview of statistical data in relation to freshwater resources and ag-water use in Canada. Atlantic Provinces have developed climate change action plans or strategies. Observations on climate change and its possible impacts and Vulnerabilities on agriculture in Atlantic Provinces were presented. Highlights of efforts that are underway to promote water conservation and efficiency, multi-use concept and appreciation of the value of water resources at all levels among other initiatives in Atlantic Provinces were presented. Water legislation in Newfoundland and Labrador has identified agriculture as a high priority over industrial and commercial use which helps minimizing water use conflicts in case of a shortage. There was a mention of the Labrador Inuit Land Claims Agreement Act (2005) that respects the first nation cultural attachment as a result of proposed water uses on their lands. Measures are in place to address a variety of impact scenarios. Studies are underway to better understand impacts on groundwater, ag water conservation and efficiency measures as well as sea level rise and soil issues. This presentation recommended the need for funding that is specific ag-water studies and initiatives.

QUESTIONS TO PRESENTERS OF PANEL 1:

- Is all the flow of the Bow River from glacier melt? The ice melt on the glacier added up over a 10-12 year period is approximately 2.6% glacier waste.

G. PANEL 2 – DISCUSSION ON ADAPTING TO EXTREME EVENTS: FLOODS, DROUGHTS, STORMS CAUSED BY CLIMATE CHANGE AND CLIMATE VARIABILITY

These presentations were geared to ideas for future adaptations, and extended from the “present adaptations” identified in Panel 1. Suggested topics included the synthesis of current understanding of future scenarios and possible Ag vulnerabilities to extreme events. Questions charged to the presenters were:

What inter-relationships exist between extreme events, agriculture and the environment? (e.g. minimum in-stream flow needs)

What new Ag vulnerabilities might be expected with extreme events?

What new types of adaptations might be required to address extreme events?

What knowledge and adaptation is needed to help Ag decision-makers cope with extreme events?

How are people likely to cope? (Ag Sector, rural communities, and various levels of government).

Adaptation Gaps and Needs: Suggestions for building agricultural and rural adaptive capacity to cope with extreme events.

ENVIRONMENT CANADA

Charles Lin, Director General, Environment Canada

Dr. Lin provided an overview of how extreme weather and climate events might be affected by global warming. Adaptation measures are needed as future climate change is unavoidable, while mitigation is required to limit and slow the eventual change and to reduce the cost of adaptation. To aid in adaptation to the impacts of extreme events in the agricultural sector, Environment Canada has a variety of observational tools (e.g., radars for precipitation) and climate model results (e.g., climate change scenarios), many of which are available on the web.

REGIONAL CAPACITY: THE WATER WOLF PROJECT

Russ McPherson, Project Manager, Water Wolf

Mr. McPherson provided an overview of the Water Wolf Project. Their work focuses on the South Saskatchewan River and Lake Diefenbaker and the opportunity for tourism development done in an ecological way.

ADAPTING TO EXTREME EVENTS

Doug Johnson, Saskatchewan Watershed Authority

Mr. Johnson provided an overview of rural water control and groundwater programs in Saskatchewan and presented ways of considering alternatives to mitigate extreme events. SWA provides programs and initiatives that can be used as resources to help land owners adapt to changes in water levels from extremes of drought or flooding. Their flow forecasts and water supply outlooks are based on historical and current data and provide information used to develop operating plans to manage extreme climate events.

PREPARING FOR EXTREME CLIMATIC EVENTS: HOW DO WE IMPROVE?

Dr. Elaine Wheaton, Saskatchewan Research Council

Dr. Wheaton provided information on SRC initiatives that address the complex questions regarding climatic changes in weather. Strategies to improve preparedness levels are a focus. She also noted that the knowledge gained from climate hazards research about weather extremes such as drought can help with predicting risk management needs.

EXTREME EVENT: ADAPTATION BY THE IRRIGATION SECTOR

Ron McMullin, Alberta Irrigation Projects Association

Mr. McMullin presented on his practical experience with extreme events in southern Alberta where community members collaborated to help each other through the drought period. He also provided an overview of changes in methods of irrigation from old to new, increasing efficiency and reducing risks. Mr. McMullin also discussed the role of water transfers in meeting water demands in times of water shortage. Transfers seem to be the way of the future to meet water needs. In times of drought, a reallocation can be from producer to producer within an irrigation district on a temporary basis, or can be a permanent transfer from an irrigation district to communities, industry, or other water users.

QUESTIONS TO PRESENTERS OF PANEL 2:

- How are you equating changing climate information into water supply or flood studies? If you're not equating climate change into it, is there guidance as to what numbers to apply? The past is not the only guide to future projections so how should all aspects be handling the past as not the only guide to the future? Around low flows, determining water

supplies is based on existing records. Tools are needed to deal with current situations.

- Reply by Elaine Wheaton: Yes, information from the past is no longer the only guide to making decisions for the future for risk management. We need to be paying more attention to both the daily and seasonal forecasts, as well as longer term climate scenario projections. Several other speakers earlier presented about the nature and reliability of this information and provided some guidance on its usage.
- Question to: Russ McPherson - Can you describe how water sourcing and water supply and demand is included in land use planning process? Not yet at that stage, the process is new and an educational lesson for those involved.
- Question to: Russ McPherson - With the discussions held, has the issue of the security of water come up or is it viewed to be an abundant supply? There's an underlying concern. There are a lot of factors including: political atmosphere has an impact; industrial growth determines what happens; population numbers has an impact. Working with various groups on source water protection.
- Question to Ron McMullin - With water trading, is it a whole region that would purchase water and from who? It can be transacted between any willing buyer and trader; have to be licensed. Early trades/transfers have been from one irrigator to another; others to municipalities and water users associations. It has to be done within the basin - it can't be done inter-basin.
- Is Alberta prepared for a lowering of water irrigation? No. Right now irrigation districts divert ~ 60% of their allocation. Coping challenges will come when they have to divert more water during drought seasons. They do not currently have a written drought plan in place but feel they are capable of handling drought situations based on past experience.
- Regarding water trading, do you have an handle on the proportion of the irrigation district's licenses that have gone to non-agricultural uses and what has been the trend in that area? ~ 8% of supply is non-irrigation use. Irrigation districts are sometimes used as water delivery systems to communities for a fee. Feedlots, food processors and fifty rural communities get their water via the irrigation system. The Calgary region has a great demand for water due to increased urban development. Water transfer is a long process that takes a considerable amount of time.

FORUM SUMMATION AND NEXT STEPS

Harvey Hill

The objectives of the forum were to: 1) improve understanding of climate change; 2) create networking opportunities and 3) foster collaboration between government departments on these issues. AAFC would like to hear from participants on whether these objectives were achieved.

Progress has been made in terms of understanding climate change and variability in the Canadian context. From the presentations several themes emerged. There's a need for long-term policies that are flexible and efficient using a holistic pro-active approach looking at social, economic and environmental objectives. Innovative solutions and integrated approaches to watershed management are critical. The issue of environmental goods and services is important and was discussed and considered in a practical and conceptual way. The scope of the provincial initiatives is impressive. Recognition of successes of hidden adaptation strategies of the past in terms of soil and water management was also made. In closing, a question for attendees to consider is, do we know what our benchmarks are to know when we've actually begun to get some resiliency; do we really know when we're on the right path, or when we're actually meeting benchmarks. Maybe at Ag Water Forum IV it would be intriguing to see have we reached some sort of milestones of what we feel are acceptable goals.

H. COMMONALITIES

- Concern is that the issues faced have happened at an incredibly rapid pace
- Ground and surface water needs protection
- Groundwater needs to be studied more
- Linked to human-induced increases in greenhouse gas emissions
- Significant and immediate intervention is needed
- Economic impact is/will be substantial
- Investment in continued research is vital to understand and prepare for response to unforeseen events and conditions
- Biodiversity identified as target for the future
- Ownership of the responsibility belongs to everyone
- Cross-sectoral, intergovernmental collaboration and cooperation are needed
- Government and science need to involve and talk to the farmers more
- Water initiatives in the future may include licensing, trading, sharing
- Water is valuable in ways other than monetary
- Ongoing assessment of the issues thinking about future scenarios to ensure best practices are applied
- Using history as a resource to aid in forecasting future challenges related to the environment and water
- Lessons for agriculture
 - Holistic approach to water accounting and management
 - Avoid over-allocation
 - Understand the system and how ground and surface water interconnect
 - Independent management arrangements
 - Avoid parochial interests
 - Recognition of investment requirements
 - Urban needs / critical human needs will take priority
 - Establish trading environment
 - Use of market or other measures to address over-allocation
 - Significant capacity within the system to adjust – does not have to be seen as negative - you need to focus on the positives
 - Trade-offs are inevitable
- Don't underestimate the capacity to adapt
- Not enough money is being spent on research
- We have to invest in watershed management
- Environmental goods and services (EG&S) opportunities needs to be better understood
- Action needs to be taken : "we're out of time: we've got to get the policies right
- Tools are needed to help make decisions and to adapt more effectively

APPENDIX A – CONFERENCE PRESENTERS / SPEAKERS

(in order of presentations)

Andrew Johnson

Dr. Henry Venema

Don McCabe

Bob Riewe

Jim Richardson

Doug Edwards

Dr. A.K. Abdel-Razek

Dr. Rhonda McDougal

Lynda Weatherby

Wayne Dybvig

Edna Foster

Darrell Corkal

Jamshed Merchant

Dr. Irene Hanuta

Dr. Charles Lin

Kaila-Lee Clarke

Dr. David Boerner

Vincent Moffet

Al Pietroniro

Dr. Dave Sauchyn

Dr. Denise Neilsen

Dr. Harvey Hill

Dr. Linda Mortsch

Russ McPherson

Doug Johnson

Dr. Elaine Wheaton

Ron McMullin

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Ag-Water Forum III
“Agricultural Adaptation to Climate Change”

March 17 & 18, 2009
Radisson Hotel - 405 20th Street East
Saskatoon, Saskatchewan

AGENDA

Objectives of forum:

1. Improve understanding of impacts of climate change on ag-water (quantity and quality) and adaptation approaches for agriculture.
2. Create networking opportunities between provinces and federal departments in water, agriculture and climate change related activities.
3. Foster collaboration between federal and provincial departments on ag-water and climate change initiatives that lead to adaptation to climate variability in agriculture.

March 17, 2009

7:30 - 8:00 a.m. Registration & coffee

8:00 - 8:10 a.m. Welcome and Opening Remarks Gord Bell

8:10 – 9:05 a.m. KEYNOTE Address - *Ag Water Resources: State of Climate Change Impacts and Adaptation, Knowledge and Capacity in Australia*
Andrew Johnson, Director, Strategic Policy for Department of Water, Land and Biodiversity Conservation

9:05 – 10:00 a.m. KEYNOTE Address - *Ag Water Resources: State of Climate Change Impacts and Adaptation, Knowledge and Capacity in Canada*
Henry Venema, Director, Sustainable Natural Resources Management, IISD

10:00 - 10:30 a.m. **REFRESHMENT BREAK**

10:30 - 11:00 a.m. KEYNOTE Address - *Farm Economy and Climate Change*
Don McCabe, co-chair of Environment and Science Committee, Canadian Federation of Agriculture

11:00 - 12:00 a.m. Provincial presentations (25 min presentation with 5 min for Questions).
Alberta Bob Riewe
Ontario Jim Richardson

Environment Canada
PARC
Maritimes

Al Pietroniro
Dave Sauchyn
A.K. Abdel-Razek

20 Minutes for questions after all presentations

12:20 - 1:00 p.m. **WORKING LUNCH** Afternoon Chair: Yves Michaud

12:30 - 1:00 p.m. *KEYNOTE Presentation - AgWater Research and Innovation - BC Okanagan Model*
Denise Neilsen - AAFC

1:00 - 1:30 p.m. *KEYNOTE Presentation - AAFC Supported Ag-Water Climate Change Adaptation Activities including Drought Preparedness, LIRA and Canada DRI*
Harvey Hill - AAFC

1:30 - 2:00 p.m. *KEYNOTE Presentation Linda Mortsch - Intergovernmental Panel on Climate Change*

2:00 - 2:20 p.m. **REFRESHMENT BREAK**

2:20 - 3:30 p.m. **Panel 2 - Discussion on Adapting to Extreme Events - (this panel is focused on Ag Adaptations to cope with extreme events: floods, droughts, storms caused by climate change and climate variability)**

short presentations of 10 minutes, representatives from:

Water Wolf	Russ McPherson
Sask. Watershed Authority	Doug Johnson
Saskatchewan Research Council	Elaine Wheaton
Environment Canada	Charles Lin
Alberta Irrigation Projects Association	Ron McMullin

20 Minutes for questions after all presentations

3:30 - 3:50 Forum summation and next steps Harvey Hill