

# **Governance and Climate Vulnerabilities: The Case of Canada's South Saskatchewan River Basin (SSRB)**

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Institutional Adaptations to Climate Change

*Presented October 26, 2009, La Serena, Chile*

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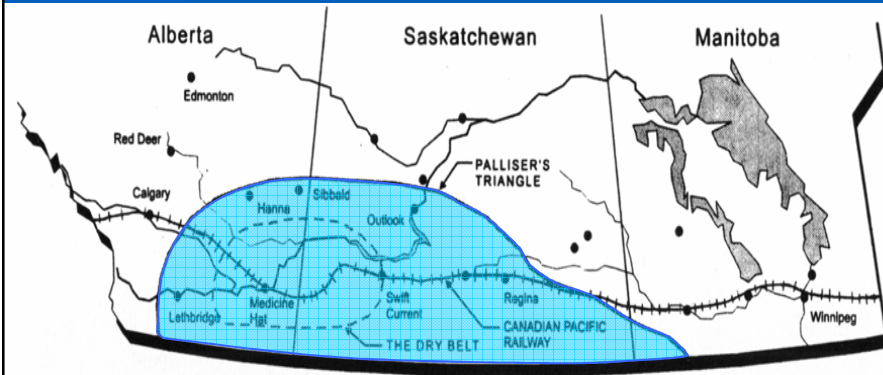
## **Outline**

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- Study site and context
- Methodology
- Results
- Conclusions
- Next Steps

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## Palliser Triangle – “unfit for habitation” - mapped by John Palliser exploration 1857-59 after a period of years of severe drought



*Map outlining Palliser's Triangle and the Dry Belt.*

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## Western Canadian Settlement

- 1800s: Prairies sparsely settled
- 1894: **North West Irrigation Act**
- Early 1900s: European settlement
- Agricultural model: land ownership for settlers; ~ one farm every 1.6 km
- 1920s & 30s; Climate and land limitations were discovered

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## Drought in 1920s & 1930s: provincial and national crises

*Dust storm near Lomond, AB (1930's)*



*Soil drifting on an abandoned  
Farm yard near Cadillac, SK*



*PFRA Origins: drought, soil drifting/ loss,  
Water conservation/ management,  
Provincial and national crisis*

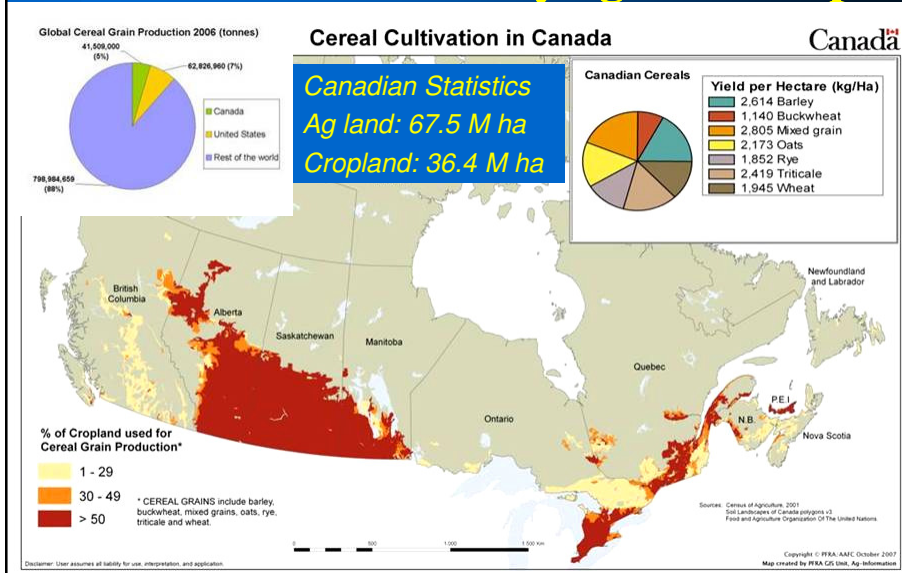
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## SSRB status as of 2009

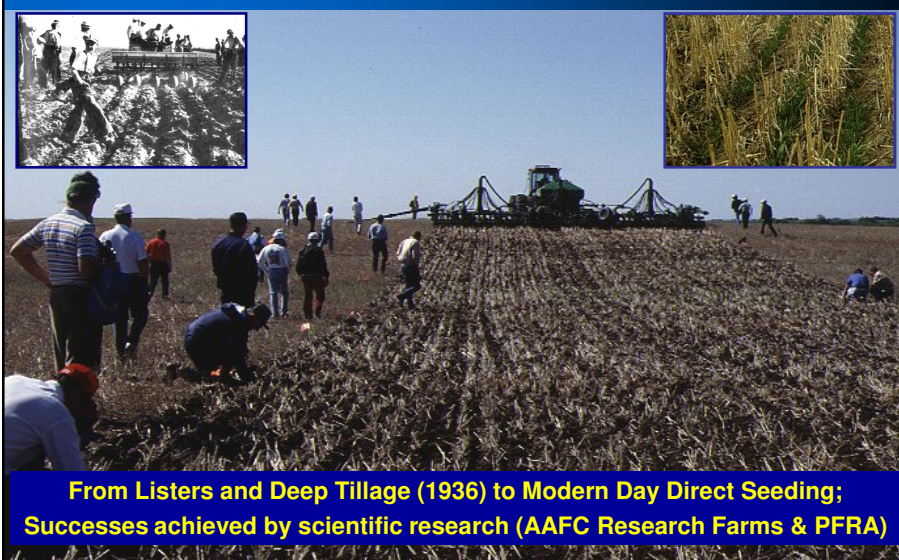
- **Successful adaptations since 1935:**
  - land management, farm practices, water development, irrigation, etc.
- **Still affected by climate variability**
  - drought, flood, extreme events
- **Natural resources are managed by shared jurisdictional arrangements:**
  - The legal mandate of the provincial government
  - In practice, water resources are managed by sharing roles with local government, federal government, and actual stakeholders

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# Prairie Region produces most of Canada's \$6.9 billion/yr grains crops



# Successful Adaptations



From Listers and Deep Tillage (1936) to Modern Day Direct Seeding; Successes achieved by scientific research (AAFC Research Farms & PFRA)

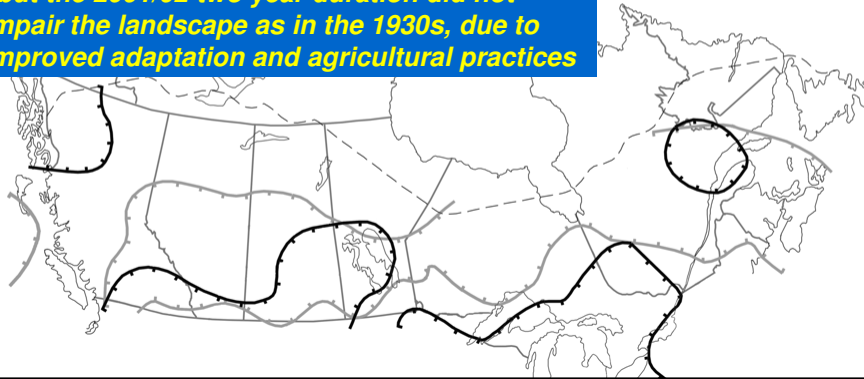
# Yet Drought remains a reality

## Canadian 2001-02 drought impacts:

- affected more land than the 1931 drought;
- \$3.6 billion drop in Canadian Ag production
- \$5.8 billion drop in Gross Domestic Product
- 41,000 job losses
- but the 2001/02 two year duration did not impair the landscape as in the 1930s, due to improved adaptation and agricultural practices

Summer (June, July, August) PDSI

-2 isoline  
 2002 drier  
 1931 wetter  
 - - - Extent of Data



## Why conduct a Governance Assessment for water vulnerabilities?

- Climate impacts natural resources
- Rural water vulnerabilities affect people/ society
- 2001-02 Canadian drought
  - \$5.8 billion drop to Canada's GDP
  - \$3.6 billion drop to Canada's Ag GDP
  - 41,000 Job Losses
- Governance decisions can either help or hinder adaptive capacity



Flooded farmstead protected by dyke

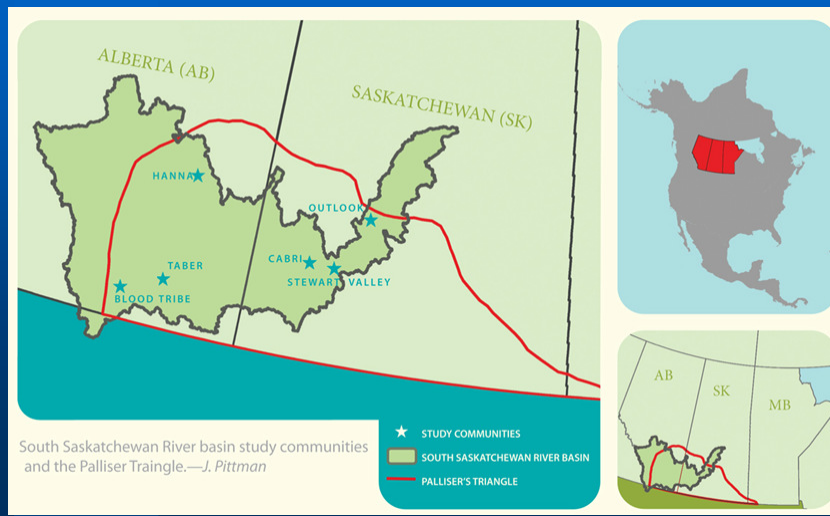
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## Assessment of Governance Organizations in the SSRB

- Alberta and Saskatchewan Agencies Studied:
  - Federal government (water, environment, agriculture)
  - Provincial government (water, environment, agriculture)
  - Local governance organizations (rural communities, stakeholders such as agricultural producers, irrigators, watershed groups)
- Agencies studied had a role in *water resources management (with related climate linkages)*
- Key findings based on “Saskatchewan Water Governance Assessment Final Report”, 2009
  - See: <http://www.parc.ca/mcri/pdfs/papers/gov01.pdf>

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## Study Site – South Saskatchewan River Basin, Western Canada



## Methodology for Governance Assessment in Saskatchewan

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- **Inventory of governance agencies**
  - Institutions and Water in the SSRB
    - <http://www.parc.ca/mcri/pdfs/papers/iacc045.pdf>
    - <http://www.parc.ca/mcri/pdfs/papers/iacc053.pdf>
- **Focused Interviews (60 representatives)**
  - Water users and associations
  - Watershed and environmental groups
  - Community representatives
  - Local, Provincial, Federal government

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## Results

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- **Three key water governance needs:**
  - long-term climate change policy planning
  - Integrate civil society
  - simplify complexity of governance
- **Respondents identified eight challenges**
  - Listed in the next slides
  - Similar to those in published literature

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## 1. Distribution of Adaptive Capacity

- Uneven distribution of resources
- Most vulnerable:
  - Kainai Blood Indian Reserve
  - Small communities (Cabri, Stewart Valley)
- Lack capacity, resources
- Need targeted policy responses to develop capacity



Small town - J. Pittman

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## 2. Policy analysis scope in communities

- A need for policy analysis to consider:
  - Heritage
  - Cultural identity
  - Develop trust-based relations
  - Build social capital and resilience
  - Sustainable development
  - Ecological resources
- Connect to local needs



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### 3. Water data availability

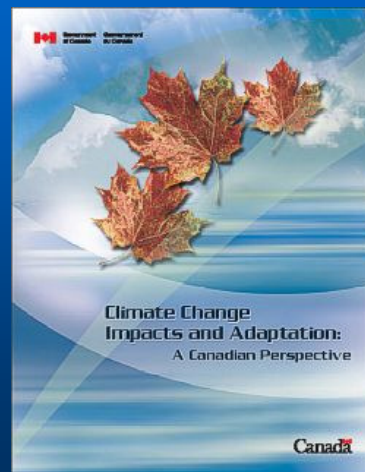
- Gaps exist:
  - Groundwater supplies, water quality, use patterns
  - Climate impacts on water resources
  - Climate change impacts on water resources
  - Long-term scenarios
    - Climate and Human Uses



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### 4. Need for long-term planning

- Current focus: mitigation
- Needs:
  - Adaptation focus
  - Strategic collaboration
  - Emphasis on drought response
    - 01/02 drought impact \$5.8 B to Canada
  - Extreme events
  - Regional efforts (across provinces)



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## **5. Effectiveness of watershed advisory groups**

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- Local stakeholder participation
- Clear mandate
- Predictable funding
- Civil society engagement
- Empowerment
- Local implementation

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## **6. Interagency co-ordination**

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- Co-ordination of water governance efforts and climate monitoring systems
- Simplified arrangements
- Clarity of roles:
  - Local
  - Provincial
  - Federal

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## 7. Operational challenges

- Stakeholders are frustrated with the number of governance agencies
- Centralized or clearer decision-making
- Stable programming
  - less frequent shifts or changes of direction
  - Longer-term vision



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## 8. Central resources for solving Climate Change problems

- Governance agency mandates and resources targeted to climate and water solutions:
  - Implement solutions to rural water problems
  - Focus on rural communities, and agricultural sector
  - Flexible programming
  - Locally relevant

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## Canada and Chile Climate and Agriculture

- **Canada**

- Irrigated Ag consumes ~90% of water
- Ag diversification is more limited than Chile
- Future potential to grow new crops?
- Adaptation requires long-term planning
- Concerns exist with institutional capacity
- *Concerns exist over environment and climate change*



- **Chile**

- Irrigated Ag consumes ~ 85% of water
- Ag impacts? (precipitation, temperature, mountain flow)
- Future effect on crops? On water? Long-term planning?
- *Concerns exist over environment and climate change*



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## Governance Conclusions

- Long-term planning need
- Increased civil society engagement
- Simplified governance arrangements

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## Next Steps

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- Canada is seeking ways to:
  - Build adaptive capacity and resilience
  - Involve stakeholders and all orders of government working together
- Linking social sciences and physical sciences is critical

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## Acknowledgements

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- University of Regina
  - Dr. Harry (Polo) Diaz, Dept of Sociology
- Our inter-disciplinary team (Canada & Chile)
- University of La Serena; our Chilean colleagues & friends (Dr. Sonia Salas, Bernardo Reyes and team)
- Social Sciences and Humanities Research Council of Canada

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*Tapado Glacier, Chile  
Corkal, Apr. 2007*

**Gracias a todos!**

