



Alberta Irrigation Projects Association

Water supply challenges and opportunities: locally and globally

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About WaterSMART Solutions

OUR MISSION

We are committed to improving water management through better technologies and practices, for the social, economic and environmental benefit of current and future Albertans, and sharing our solutions with Canada and the World.

ACHIEVED THROUGH

Project development and execution

Identifying opportunities and innovative solutions to work toward a vision of improved water management

Collaboration and communication

Valuing collaboration and engagement by bringing diverse individuals and organizations together, to work toward common goals and accommodating multiple interests

Water strategy

Conducting effective projects on water strategy for corporations, consortiums and other organizations

Supported by people knowledgeable in all aspects of water management at local, regional, and global levels

Water is different from other resources: it is emotional

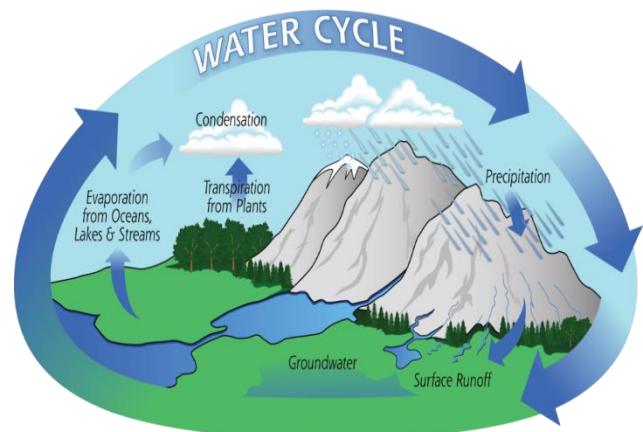
Water is very personal

- It hurts when its **YOU**
- Watershed impacts are highly localized
- Debate on water as a human right
- Emergence of “Water Protectors”



Water is fluid

- EVERYTHING is connected
- Water has a natural cycle
- Water crosses political boundaries
- Groundwater moves differently from surface water



Whiskey is for drinking ...

Water is for fighting over.

Water issues are complex

Water for People



Water for Industry



Water owned and shared by states



Water for Food



Water for the Environment



Water has management challenges

3 Problems with Water

too much



too little



too dirty



Climate is water... water is climate

“The strong link between climate change and water has contributed to the view that if mitigation is about carbon, then adaptation is about water.”

Alberta Climate Dialogue 2014



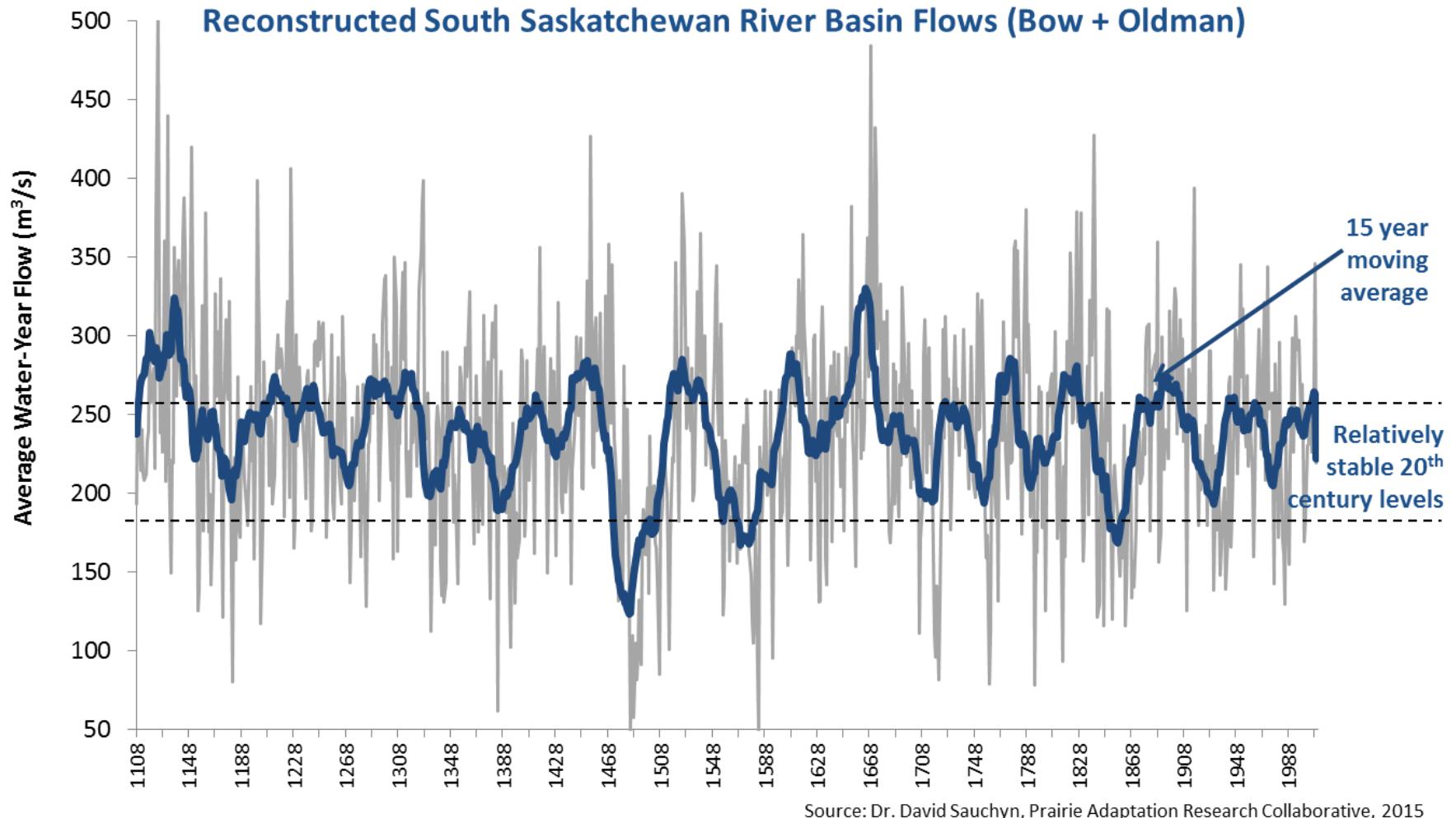
Mitigation
is about
greenhouse gas
is global
is a trigger
takes time



Adaptation
is about water
must be local
is about action
is needed now

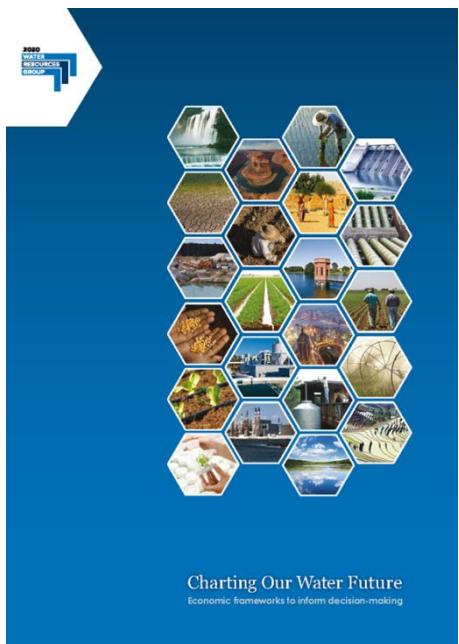
Climate change will have a direct, significant impact on water resources

History demonstrates natural climate variability

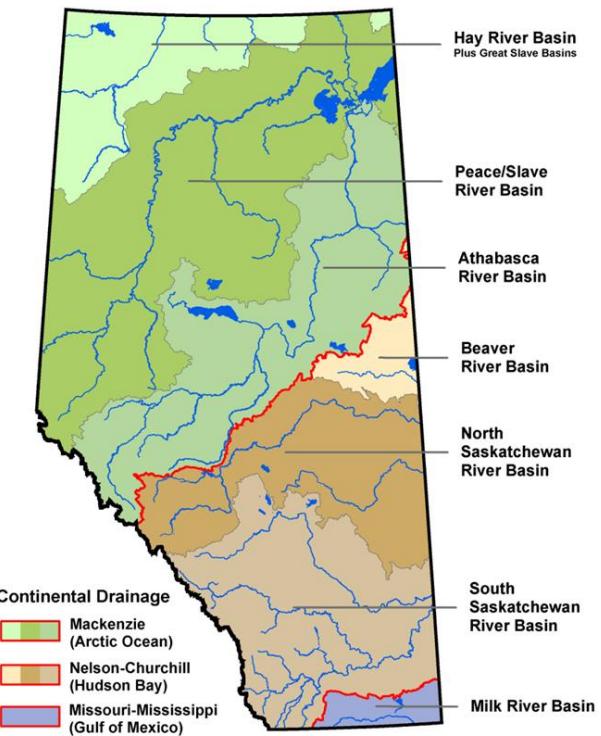


Scale is critical

Think globally



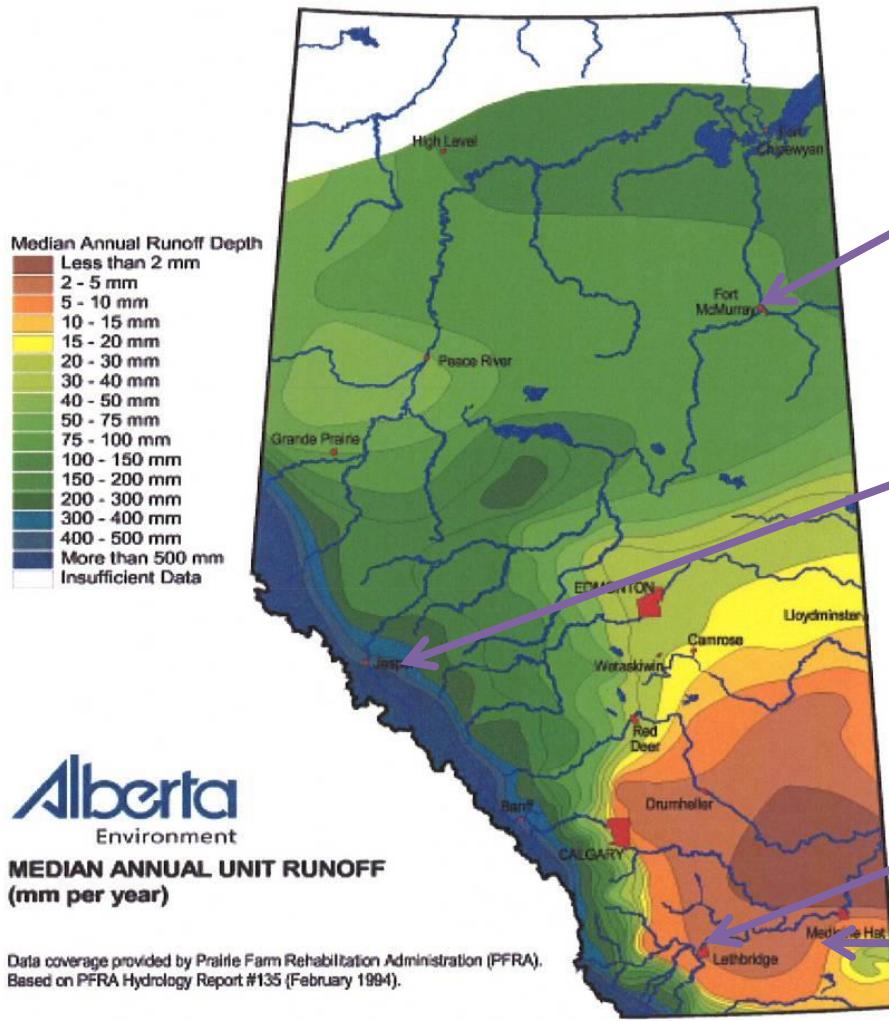
Plan regionally



Act locally



Water issues vary across Alberta



Opportunities to deal with water management challenges

Current and potential opportunities for managing water in Alberta when there is too much, too little, or it is too dirty for a range of needs and users:

- Storage
- Collaborative stormwater management
- Reuse
- Managing quality – the concept of a water credit trading system such as similar carbon trading systems
- Water conservation, efficiency and productivity
- Watershed stewardship- many principles that make up good business practice and sense

Current conversations on water storage

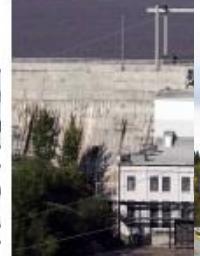
SSRB Adaptation Roadmap Level 1

**Ghost
over 5**

TransAlta cedes

By Robson Fletcher, CE

Adjust
(for W)

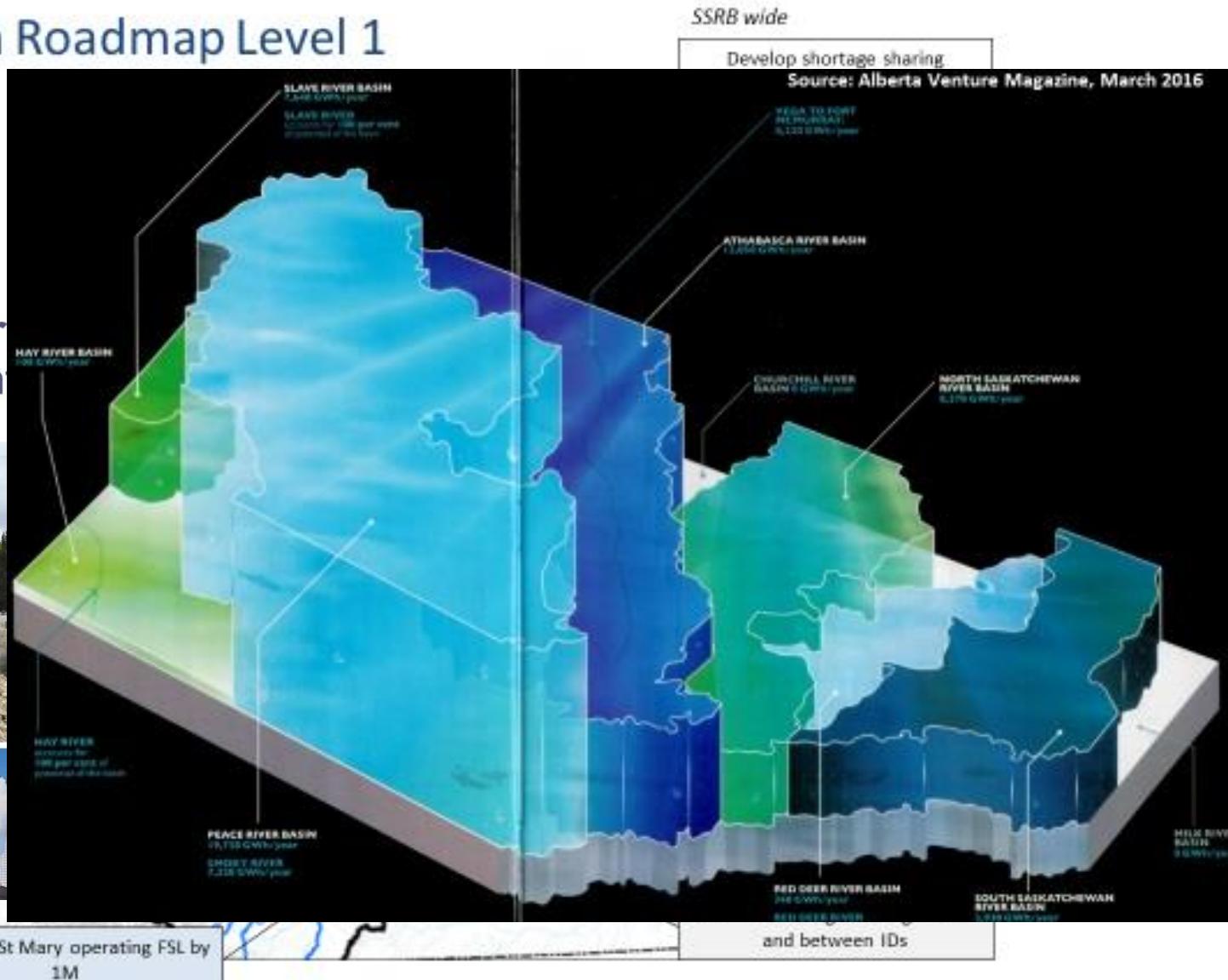


The province and TransAlta
(Press)

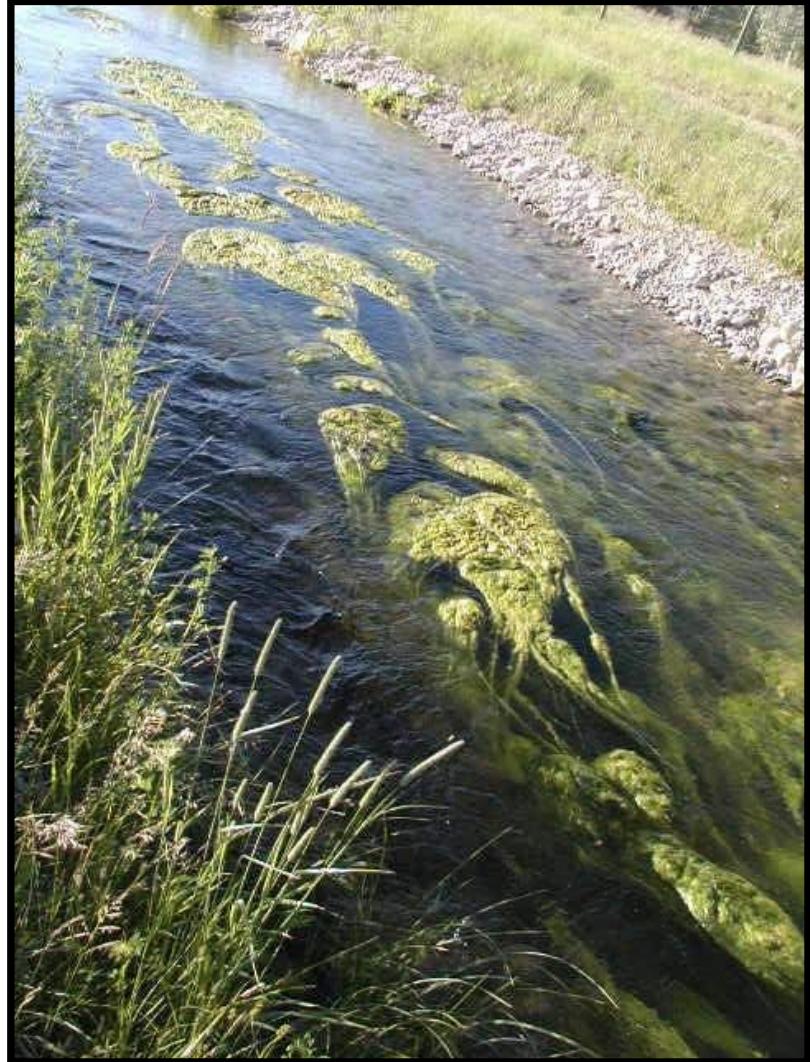
**Water
Saskat**



Increase St Mary operating FSL by
1M



Managing stormwater- shared challenges



It's not just what you are doing- growing
need to look outside the fence.

*In June 2012, the Co-operative Stormwater
Management Initiative (CSMI) table was
formed*

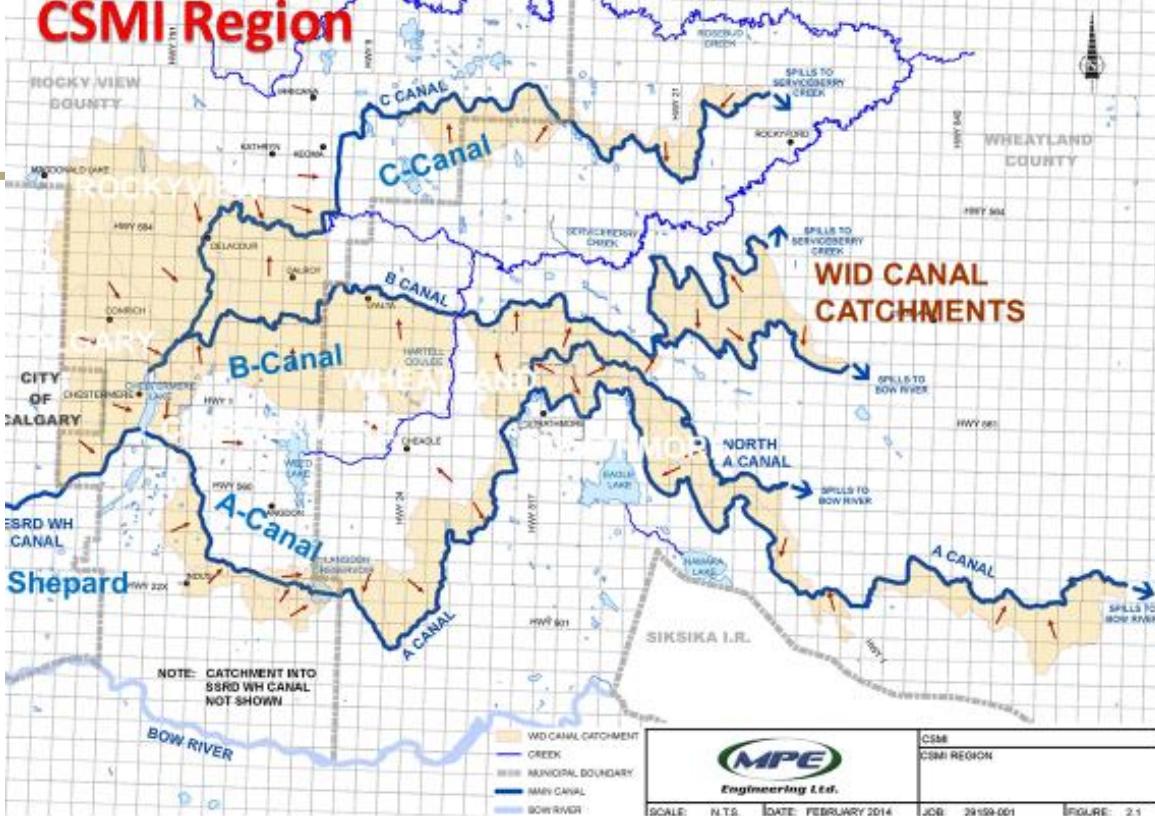
CSMI- shared geography

- WID and municipalities share drainage in area
- Irrigation water from Bow River weir high quality
- Quality degrades along canals from urban and rural runoff
 - Phosphorous, salinity, coliforms, TSS
 - Weeds plug intakes, reduce canal capacity, increase O&M
- Alberta Environment and Parks (AEP) stormwater guidelines don't meet irrigation quality
- Municipalities need a solution ... WID needs a solution ... shared geography means a shared solution

CSMI Participants

Partners

- Rocky View County
- City of Chestermere
- City of Calgary
- Town of Strathmore
- Wheatland County
- Western Irrigation District



Observers

- Alberta Environment and Parks
- Calgary Regional Partnership

Facilitator and knowledge domain contributors

- Alberta WaterSMART
- MPE Engineering
- Bow River Basin Council (BRBC)
- Ducks Unlimited

Water reuse in Alberta: examples of reuse projects

- **Municipal Effluent for Industrial Reuse**
 - Gold bar WWTP – 8,800 m³/day
 - Bonnybrook WWTP – 14,000 m³/day
- **Industrial effluent for industrial reuse**
 - Alberta Newsprint Company treated effluent for hydraulic fracturing
- **Stormwater used for toilet flushing**
 - Telus Spark, University of Lethbridge water and environmental science building, Calgary municipal buildings and international airport, etc.
- **Stormwater used for irrigation**
 - Golf courses and public parks (Inland Athletic Park, etc.)

Water reuse: some water reuse is already happening, and municipalities and industry are waiting for direction to advance on many reuse opportunities (e.g., Water conservation policy for upstream oil and gas operations).



Nonpoint source nutrient reduction: concept of water credit trading

CO₂ in energy production makes GHG reductions possible by providing a business case for developing renewables and reducing emissions because carbon has a price.

- Nutrient reductions and credits can provide the business case to sustainably improve water quality in watersheds
 - A nutrient reduction trading market can be used as a tool to improve water quality and be self sustaining
-
- Agriculture is the single largest source of nonpoint source (NPS) nutrient discharges globally
 - NPSs more challenging to control, monitor, and regulate than point sources (PS)
 - Agriculture best practices and/or ecosystem restoration result in reductions of nutrient discharges, mainly NPS runoff, which can be quantified- generating credits
 - Very cost effective to generate relative to end of pipe PS solutions (e.g., 10x cheaper)
 - This creates economic incentive to decrease nutrient runoff- indirectly regulates NPS reductions
 - Improves receiving water body beyond what PS controls can do collectively
 - Infuses investment in NPS contamination control by non-traditional parties
 - Regulatory/governance mechanism needed to allow for trading of credits

A business and policy case for the concept of water credit trading

Business should be interested because:

- Provides another alternative to meet discharge requirements, support sustainability, corporate social responsibility, and water stewardship goals and commitments
- Reducing nutrients or other pollutants from other sources is often more cost-effective and still protective of water quality

Regulators should be interested because:

- A way to leverage private sector investment in watershed scale ecosystem restoration and creation, and agricultural Best Practices
- Can lead to better overall watershed quality by better addressing non-point sources

Credits can be:

- quantified and verified- level of credibility and validation equal with the intended use of the credit
- retired to permanently remove the contaminants from the waterways
- traded or sold (market availability dependent)
- used to offset a compliance requirement

Examples include:

- Chesapeake Bay Regional Water Quality Trading Program
- Nonpoint source water quality trading in Louisiana

Acting on opportunities: Water Conservation, Efficiency and Productivity (CEP) plans

Looking Back: Evaluating Sector Improvements in Water Conservation, Efficiency and Productivity (CEP) (Alberta Water Council, October 2017).

Irrigation Sector's Highlights

- 26%  in total water diversion
- 11%  in return flow
- 30%  in net use
- 22%  improvement in water productivity
- 30%  improvement in water efficiency

These improvements can be attributed to four main CEP activities:

- a transition from less efficient on-farm application systems to **low pressure centre pivots**
- the **replacement of canals by pipelines** (eliminates evaporation, seepage and spill losses)
- **canal lining** to reduce seepage, where replacing canals with pipelines was not feasible
- increased **automation of canal control structures**

From 2005 to 2014, the assessed acres increased by 5.2% and the average irrigated area grew by 1.2% while total water diversions declined.

Watershed Stewardship

“Global water crises are the biggest threat facing our planet and the global economy.”

* Source: World Economic Forum (2016) Global Risks Report

“The world’s water crisis is not so much one of absolute scarcity but one of governance.”

* Source: UN Development Programme (2006) Beyond Scarcity: Power, poverty and the global water crisis

Alliance for Water Stewardship (AWS): a multi-stakeholder, user-centred approach to tackling shared water challenges.

The key value is that the AWS standard:

- requires an understanding and evidence of the watershed ‘outside the fence line’ (**an organization’s role/impact in the watershed**) and **engages stakeholders** to come up with a water stewardship plan of action that will lead to improved performance and health of the watershed
- is a **globally-endorsed Standard** that drives transparency and collaboration within a catchment context. Site based, applicable in any sector, in any region.

FOUR POSITIVE OUTCOMES



Sustainable
water balance



Good water
quality



Improved
water
governance



Healthy water-
related areas



Alliance for Water Stewardship



A global membership-based collaboration of businesses, NGOs and the public sector, working with credible national and regional partners

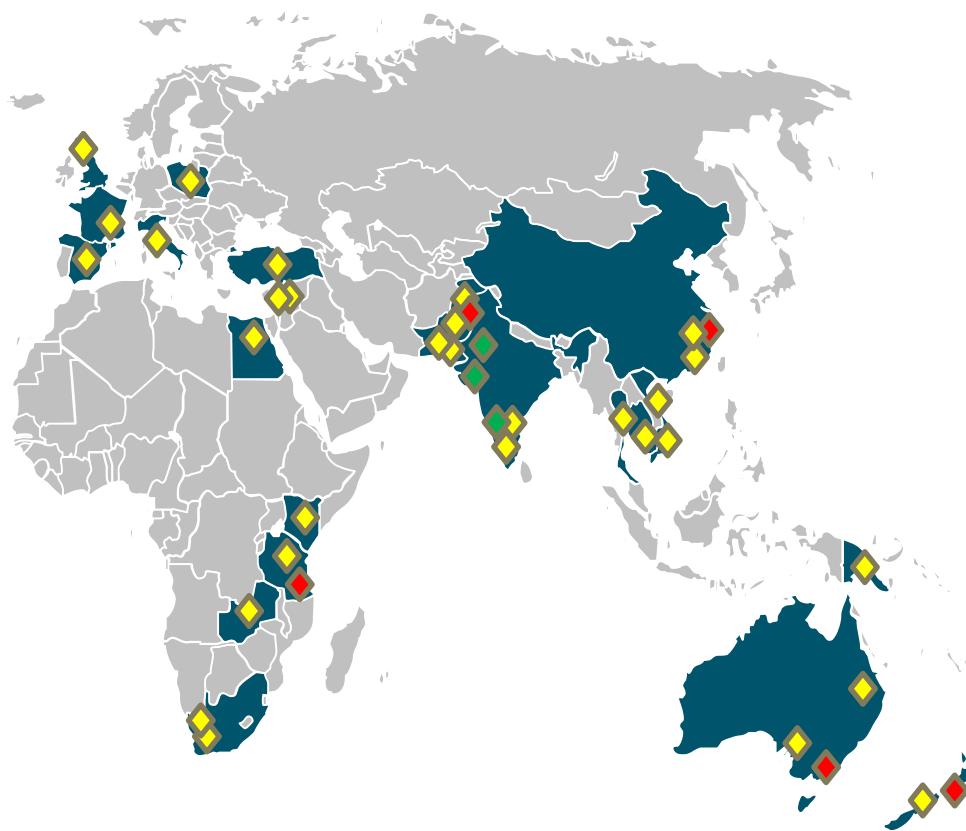


Developed through a 4 year global, multi-stakeholder process	Compliant with all ISEAL codes of best practice	Independent 3rd party certification	Credible claims of meeting best practice
Capacity building and uptake led by regional partners and networks	Water stewardship networks link local context and international governance	Accredited experts support & assess implementation	

Current status: 8 certificated sites (2 major agri-businesses) | 40+ sites seeking certification
| Several hundred sites using AWS Standard as guide | Standard implementation on all continents

AWS Standard global update

- AWS Certified sites
- Sites formally seeking AWS certification
- AWS Standard projects at community level



Primary uptake to date

- Food, beverage agricultural supply chains
- Food, beverage production facilities
- Retail agricultural supply chains
- Textile agriculture and processing

Example: Peruvian asparagus for retail in Europe

Demand for asparagus in Europe driving severe groundwater depletion, community water insecurity and water-related conflict

Multi-stakeholder partnership facilitated by AWS comprising

- European retailers
- Major Peruvian growers
- Ag-suppliers
- Local government
- Local academia
- International NGOs
- Development finance

AWS Standard training and implementation led to

- Improved on-site water practices
- Improved trust between local catchment actors
- Collective, catchment level approach
- Collaborative, user centred governance
- Increased priority for water in policy networks
- Connections built between retailers and suppliers



AWS water stewardship supporting the sustainability and competitiveness of Peruvian asparagus production



BARFOOTS
grown with love



coop

YOUR
M&S

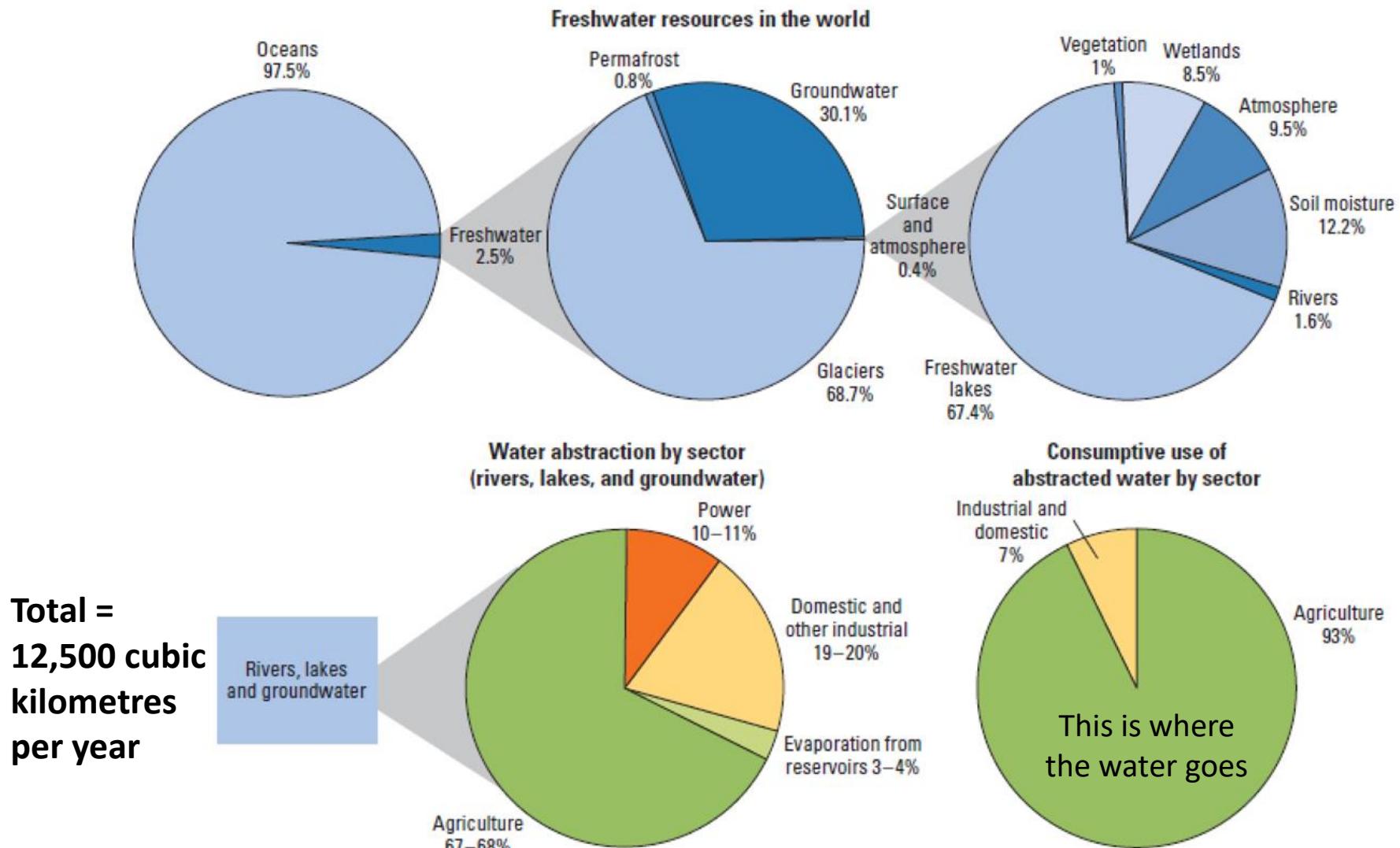
SGS



UNIVERSIDAD
DEL PACÍFICO

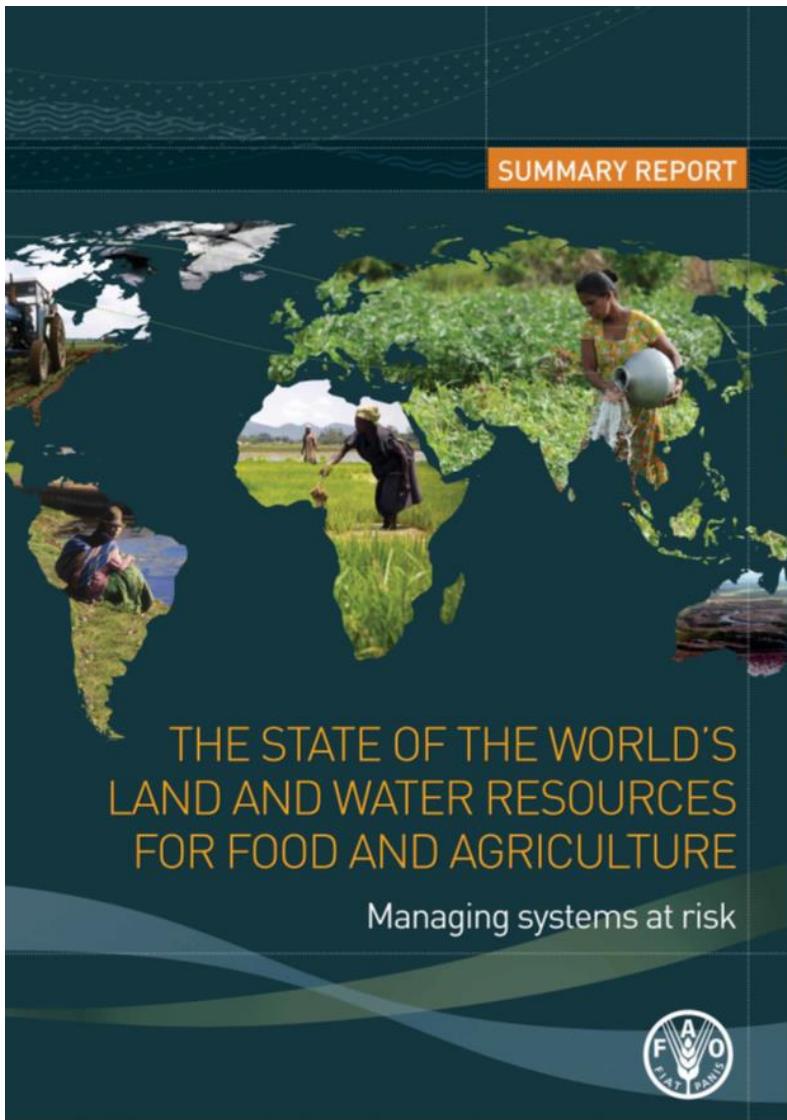


Global Water Resources are Finite



Sources: Shikolmanov 1999; Shikomanov and Rodda 2003; Vassolo and Döll 2005; World Health Organization

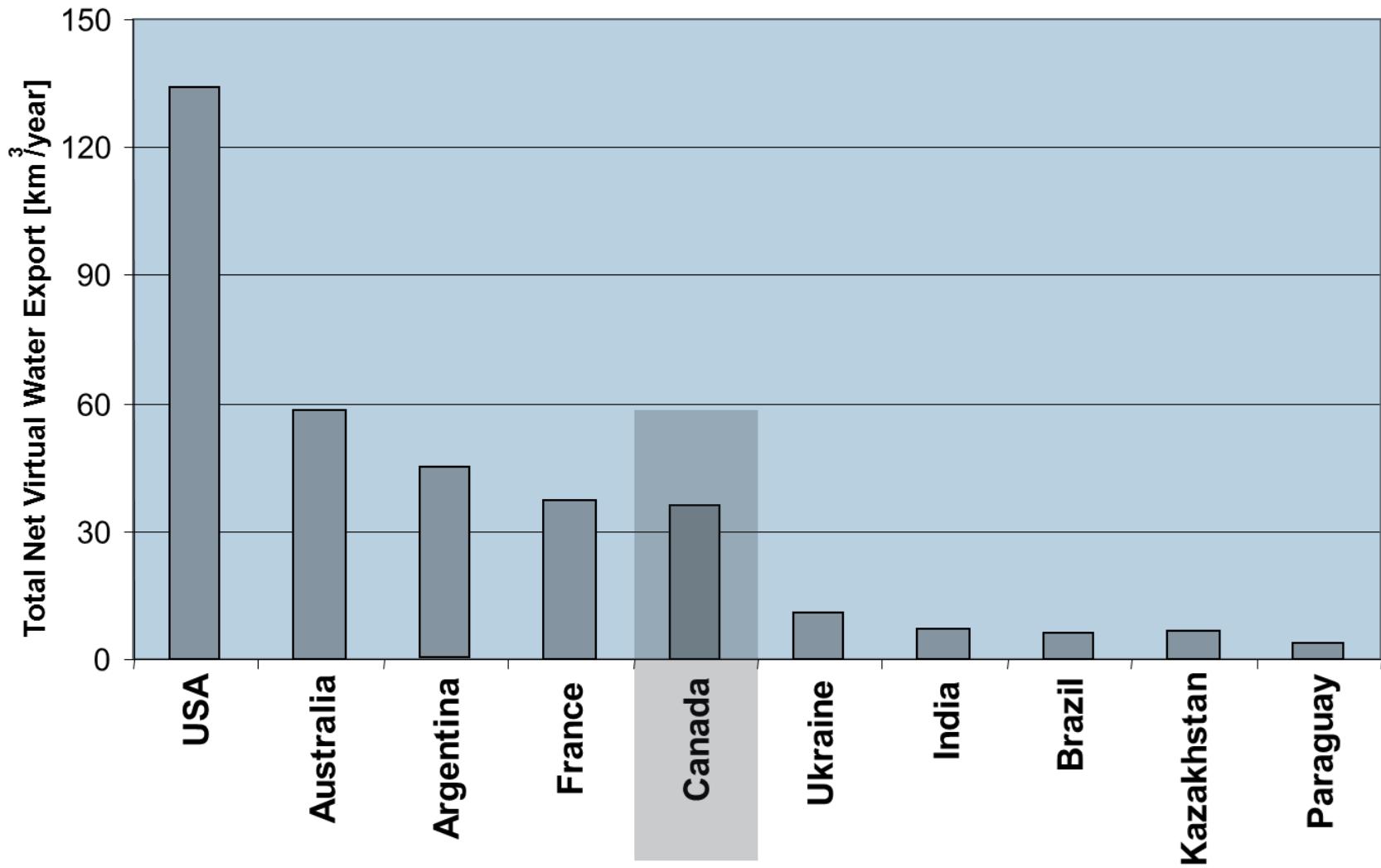
Do we have enough water to grow the food?



“Toward 2050, rising population and incomes are expected to call for 70 percent more food production globally, and up to 100 percent more in developing countries, relative to 2009 levels.”

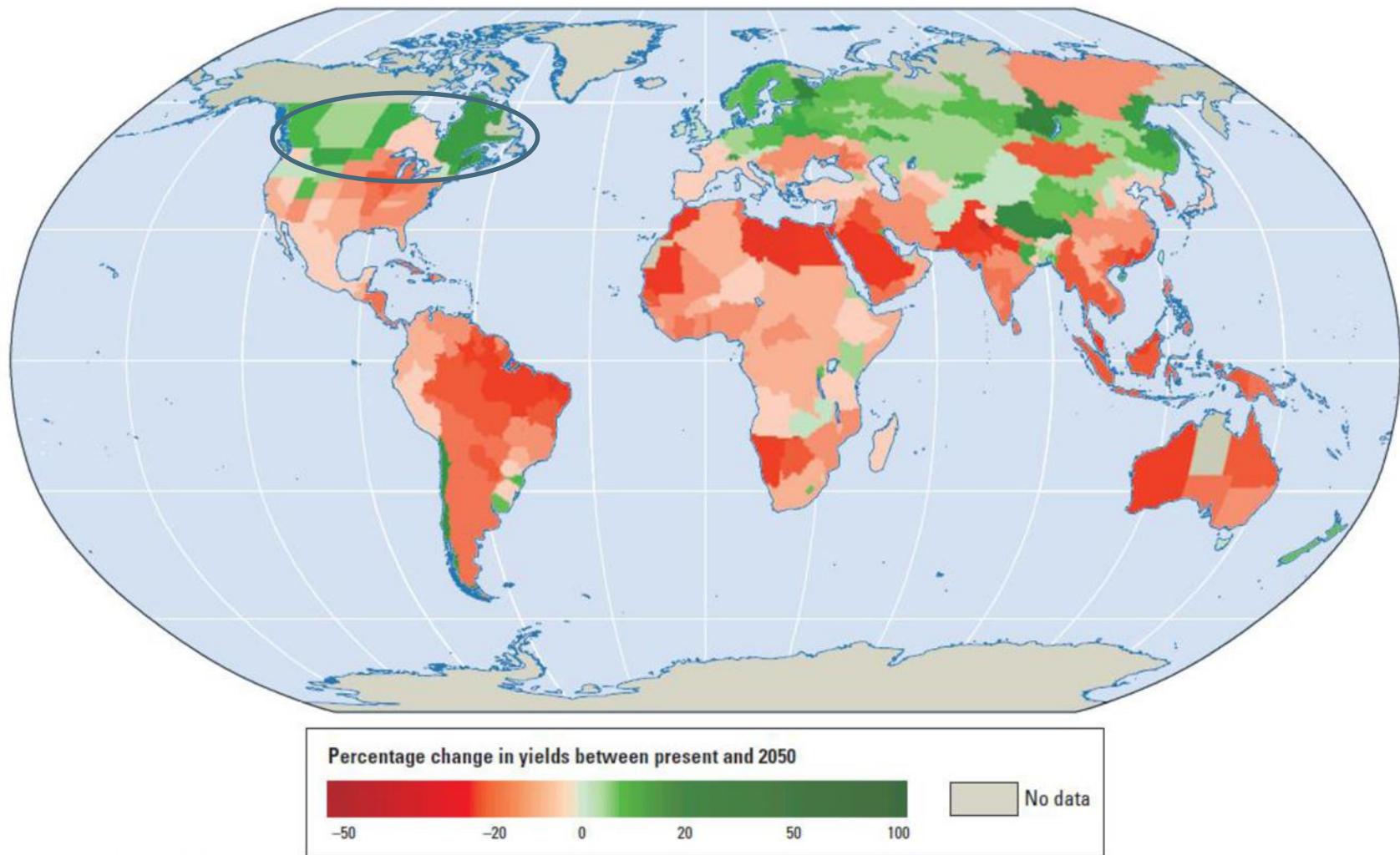
“The largest contribution to increases in agricultural output will most likely come from intensification of production on existing agricultural land.”

Countries export water in food



Adapted from Liu et al. 2007; Courtesy Dr. A. Zehnder AWRI

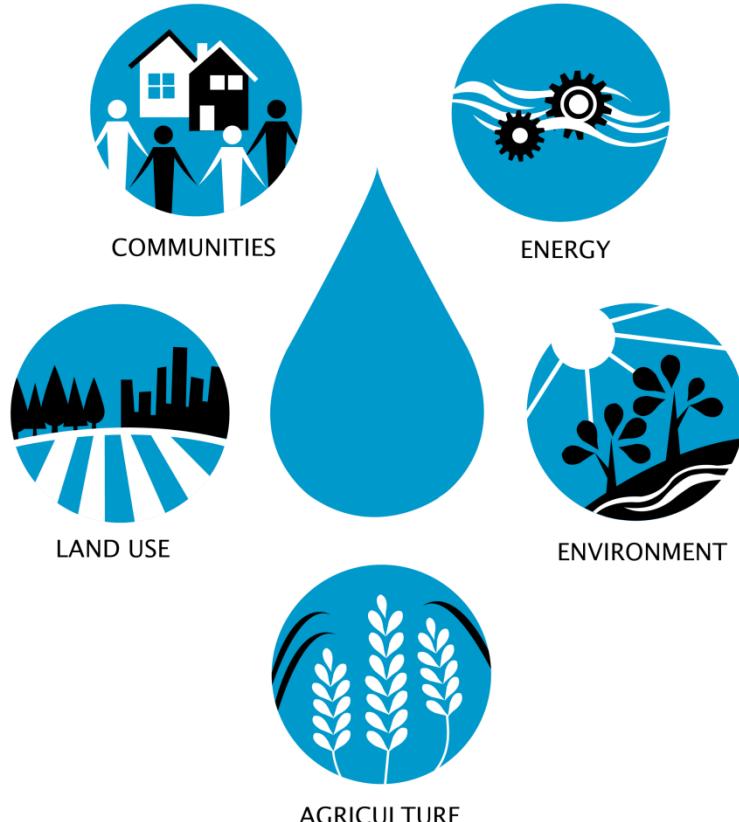
Food yield changes to 2050



Source: Müller and others 2009.

This is the policy challenge for Alberta

THE ALBERTA NEXUS



What is the Nexus?

The interconnectedness and interdependency of our global resources including **water, food, and energy**.

How does the Nexus apply to Alberta?

The Nexus is the interconnectedness between water, communities, environment, agriculture, energy, and land.

Check out www.albertawater.com/nexus

Water: the key to our sustainable future



For more information:

Alberta WaterPortal
www.albertawater.com

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www.albertwatersmart.com

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