

The Severe Drought of 2001-2002: An Overview of Impacts and Adaptations in the Canadian Prairies

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Main Points

Acknowledge: V. Wittrock, SRC; S. Kulshreshtha, University of Sask; G. Koshida, Environment Canada, and many Collaborators

Impacts on the environment, economy, and society were severe

Adaptations were undertaken--several were difficult, costly, disruptive and failed

Improvements in many areas are vital to reduce vulnerability

Main Questions



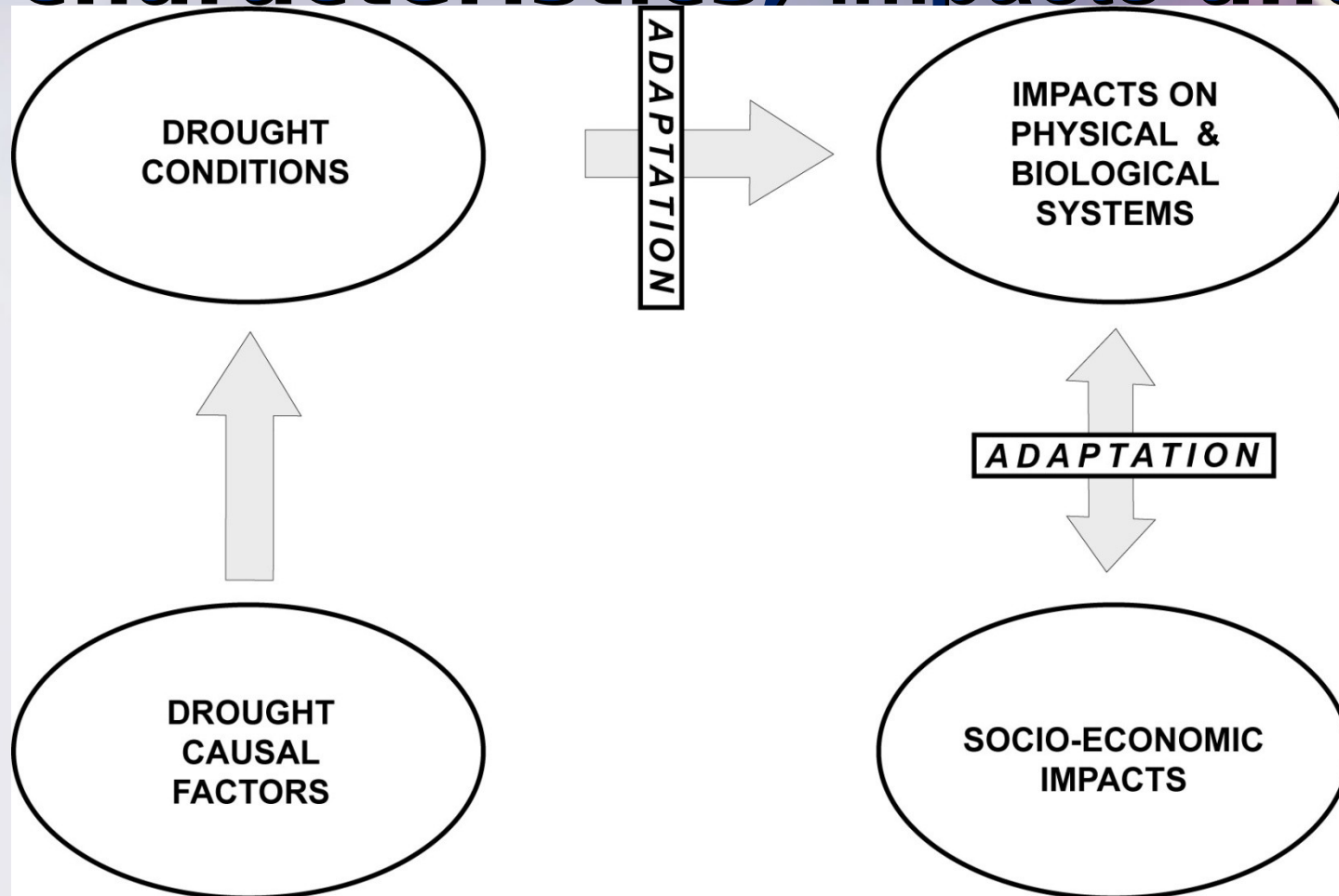
What were the main physical, biological and economic **impacts** of this drought?

What were the main **adaptations** and how effective were they?

Are we **prepared** for the next major droughts?

How can we better prepare for the **next** droughts?

Interaction framework: drought causes, characteristics, impacts and



Drought Impacts Can Be Numerous, Severe and Affect Many Sectors – Examples

Flow

Drought, from coast to coast

St. Lawrence Seaway

Prices dip

2001

Drought in parts of the Prairies played a role in reduced grain

Drought losses mount in Sask., Alta.

Once fall hits, and winter, you can expect to see layoffs and closures. It's going to affect a lot of rural Western Canada.

Drought fallout widespread

Drought puts pastures in peril

Hot, dry summer hits areas across Canada

Drought-stressed farmers need help

Farm earnings shrivel

12.2 per cent Sask. decline

Drought costs economy millions

Grain industry expected to generate \$770 million less than last year

Net farm income

Province	2000	2001
Manitoba	1,506	801
Saskatchewan	1,775	1,584
Alberta	1,546	1,113
British Columbia	857	541

REGINA — Saskatchewan's first financial analysis of the 2001 drought projects the province's grain industry will bring in \$770 million less revenue than last year.

“I seriously question whether that drop won't be even greater. Here in the central part of the province, people who thought they had half a crop found they had a quarter of a crop in the field.”

“Once fall hits, and winter, you can expect to see layoffs and closures. It's going to affect a lot of rural Western Canada.”

“I suppose, as the federal agriculture department released its 2002-03 farm income forecast last week, it will be a surprise that the province's drought-stricken crop industry didn't fare as well as it did last year.”



Impacts of the 2001-2002 Drought: Water Resources

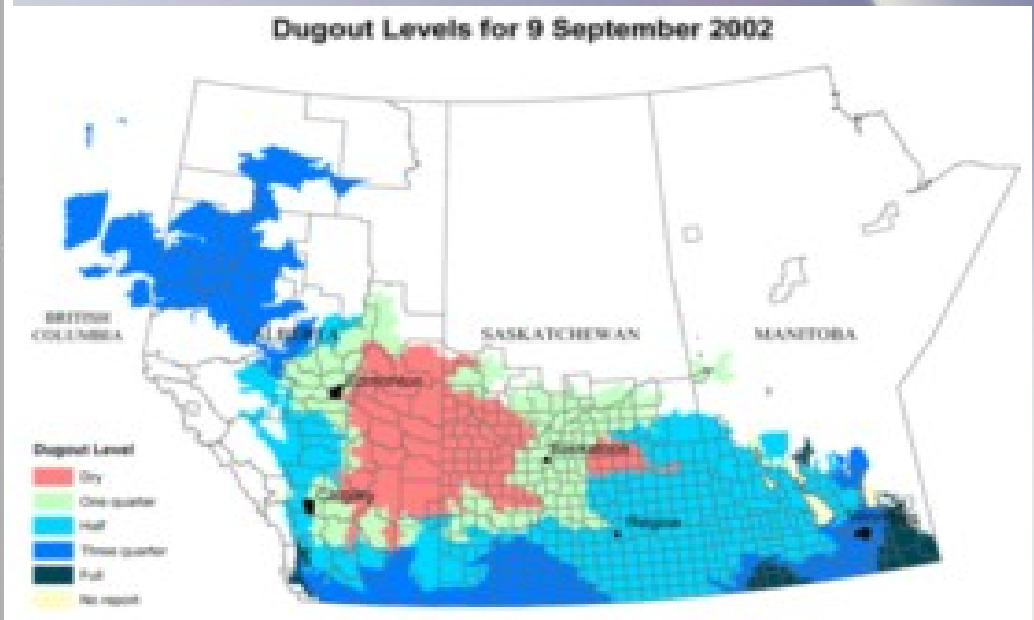
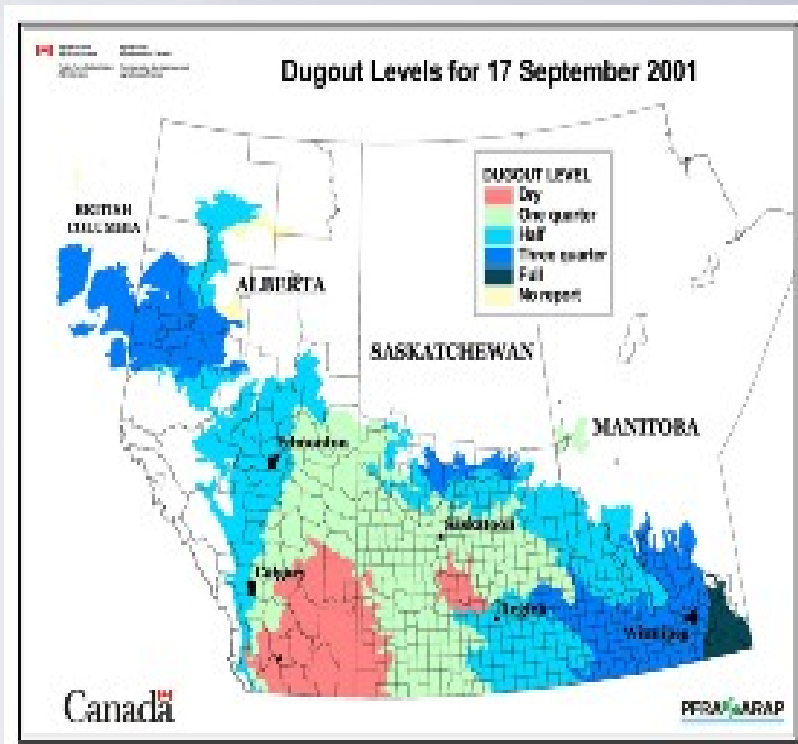
m Previously reliable and good quality **water** supplies were severely affected, and some failed

Records were set; e.g., lowest water levels in the Georgian Bay Area

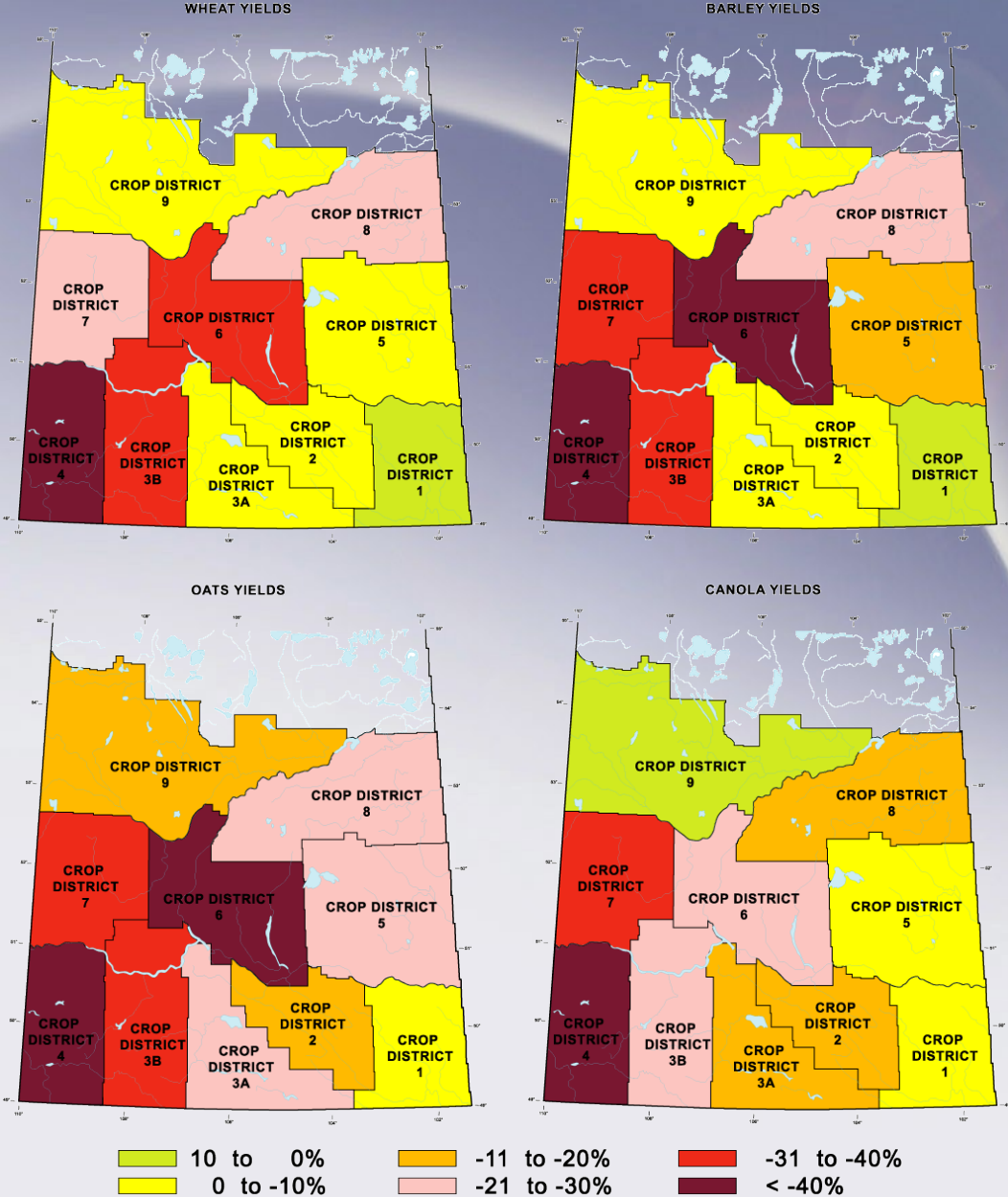
The number of prairie **sloughs** was the lowest on record in May 2002



Dugouts are an Important Source of Farm Water



Spatial Patterns of Crop Production in 2001 Drought

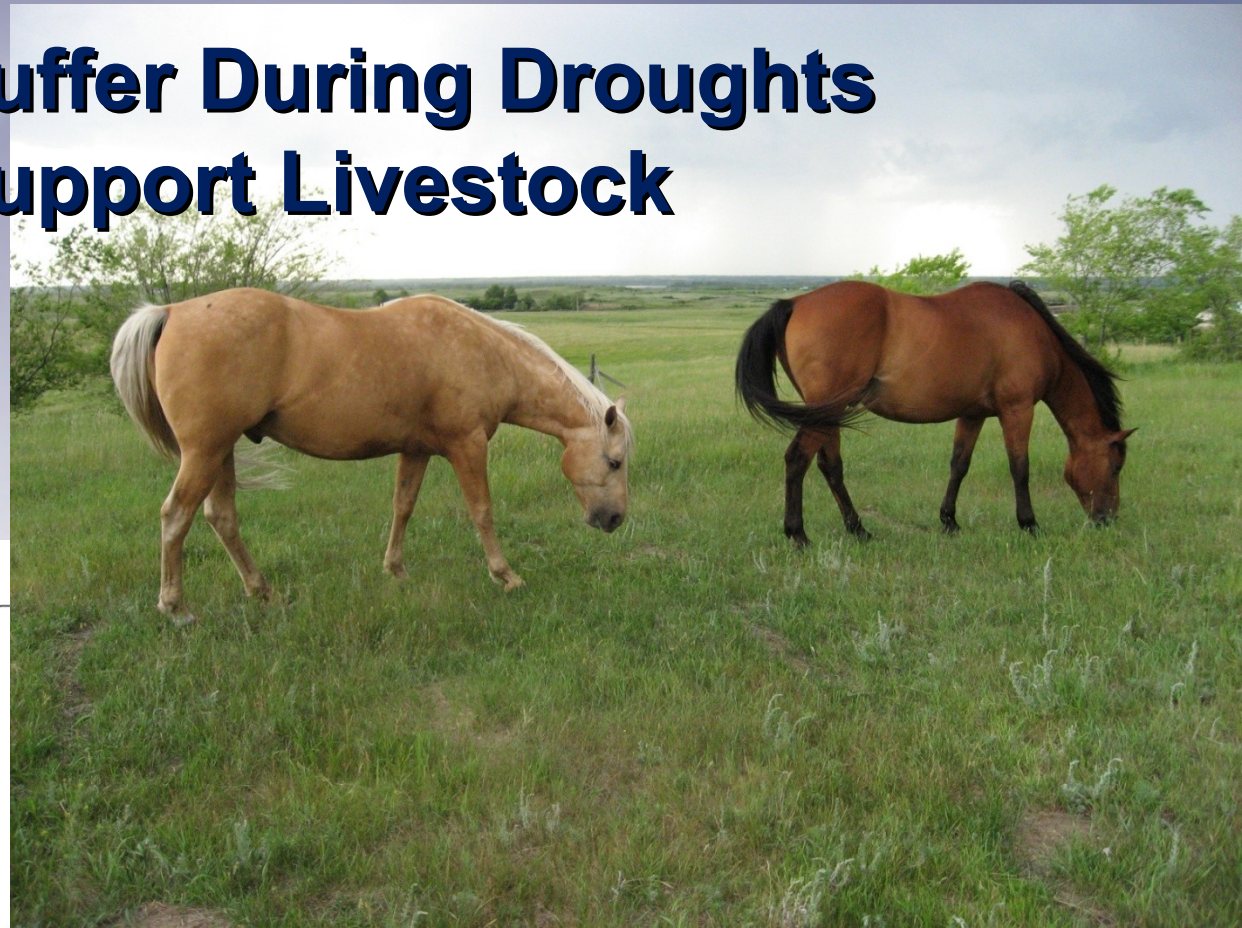


Data source: Saskatchewan Agriculture and Food

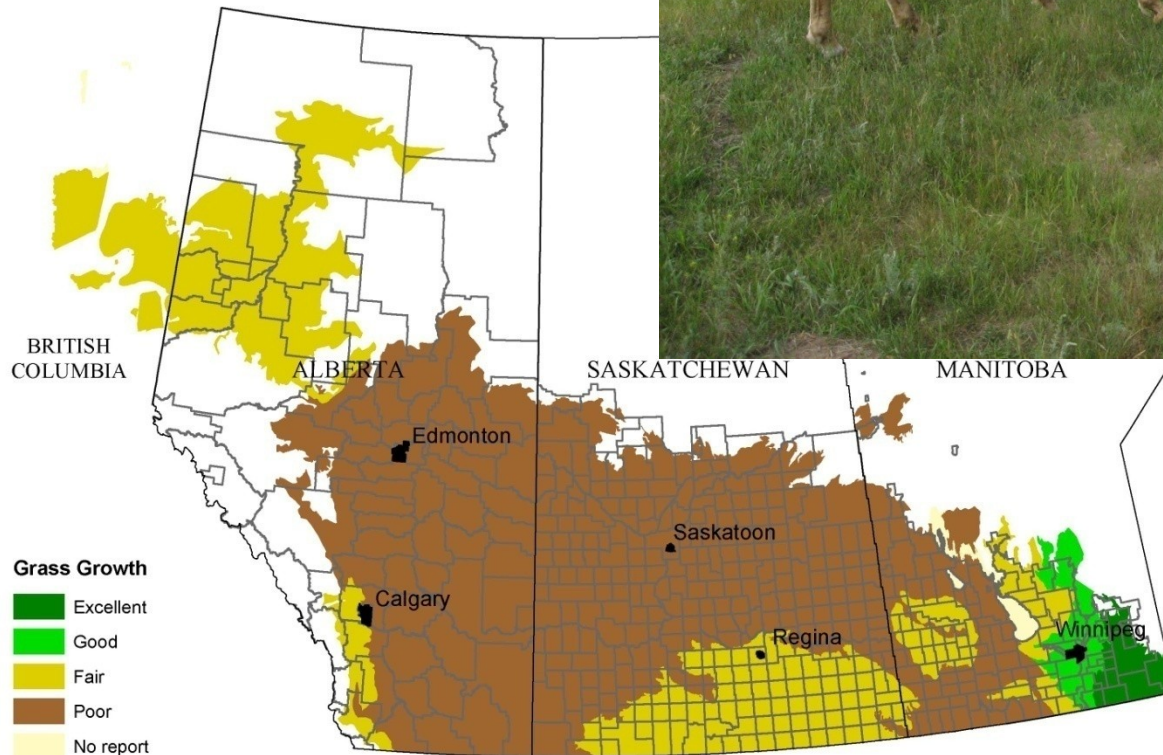
Percent Above / Below 10-year Average (1991 - 2000 average bu/ac)

Grasslands Suffer During Droughts

Grasslands Support Livestock Production



Grass Growth on Pastures
for 6 June 2002



Some Economic Impacts of the 2001-2002 Drought

Total Canadian agricultural production loss was ~\$3.6 billion

Gross Domestic Product fell ~\$5.8 billion

Employment losses > 41,000

Worst year was 2002

Alberta and Saskatchewan were hit hardest

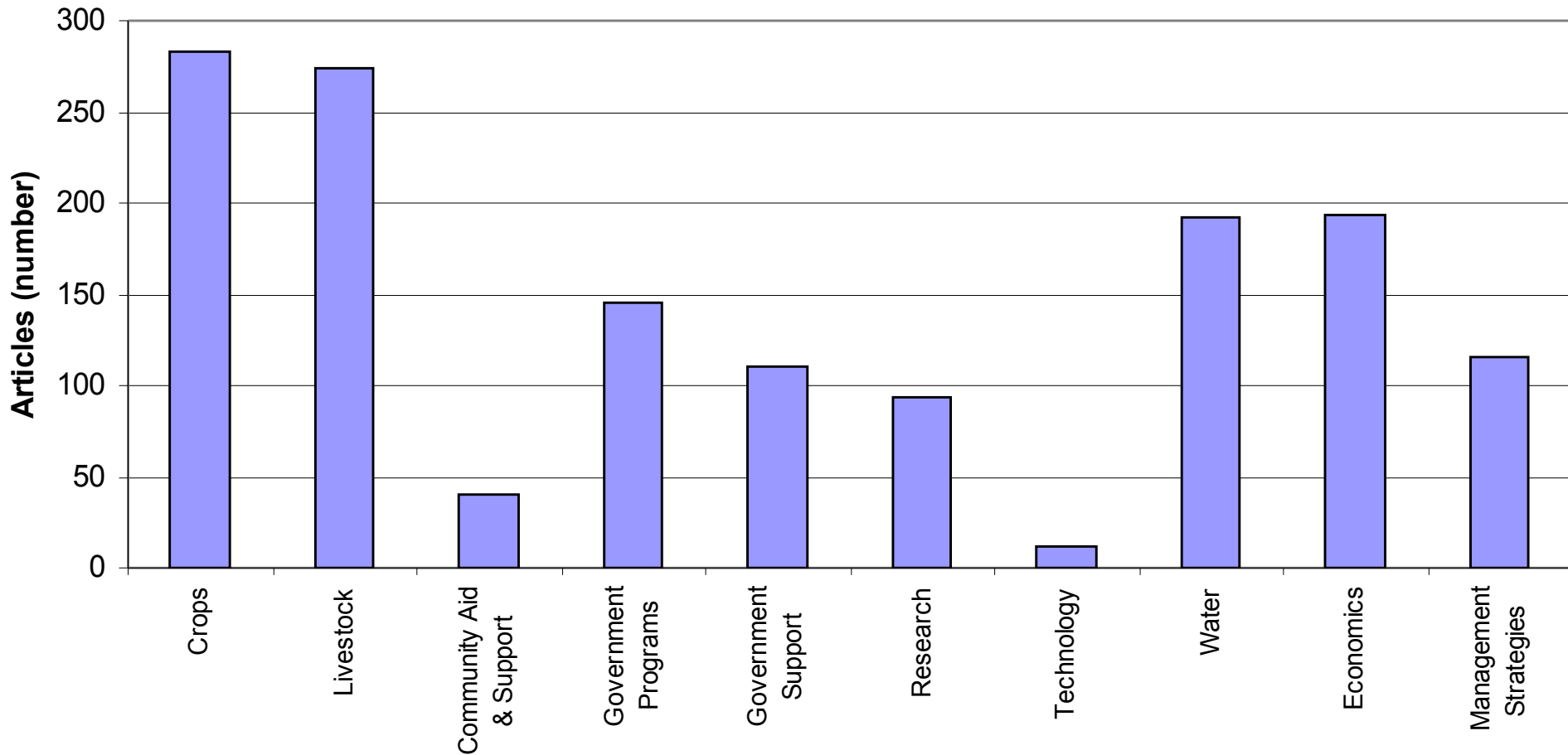


(Wheaton et al. 2005, 2008)

Adaptation Option Types

Prairie Provinces

Adaptation Type - Key Words



Observed Short-Term Adaptation Strategies: Crop Examples

Technology/ Research	Government Programs	Farm Management	Farm and Secondary Industry Financial	Community cooperative Support
Equipment was modified to deal with stunted crops Drought resistant crops	Crop Insurance, National Income Stabilization Account Low interest loans Disaster payment Pest control Information, e.g., future climate	Cropping strategies, e.g.: <ul style="list-style-type: none"> • crop rotation • change seeding times depending on soil moisture • reseeding • weed and insect management • crop diversification • drought tolerant species 	Sold crops during shortages to obtain higher prices-- worked until 2003 when the inventory was low	Seed suppliers offered producers to take some of the financial risk of production due to inclement weather

Observed Long-Term Adaptation Strategies: Crop Examples

Technology / Research

Drought Resistant Crop development: canola, winter wheat, corn, spring

Long-range weather forecasts

Weather/climate monitoring network

Soil moisture modelling

Soil moisture conservation strategies to reduce soil erosion and weed growth

Impacts and adaptation to climate change

Government Programs

Assessment of future government assistance programs

Agriculture Policy Framework

Agriculture Drought Risk Management Plan

Farm and Financial Management

Expansion of minimum tillage

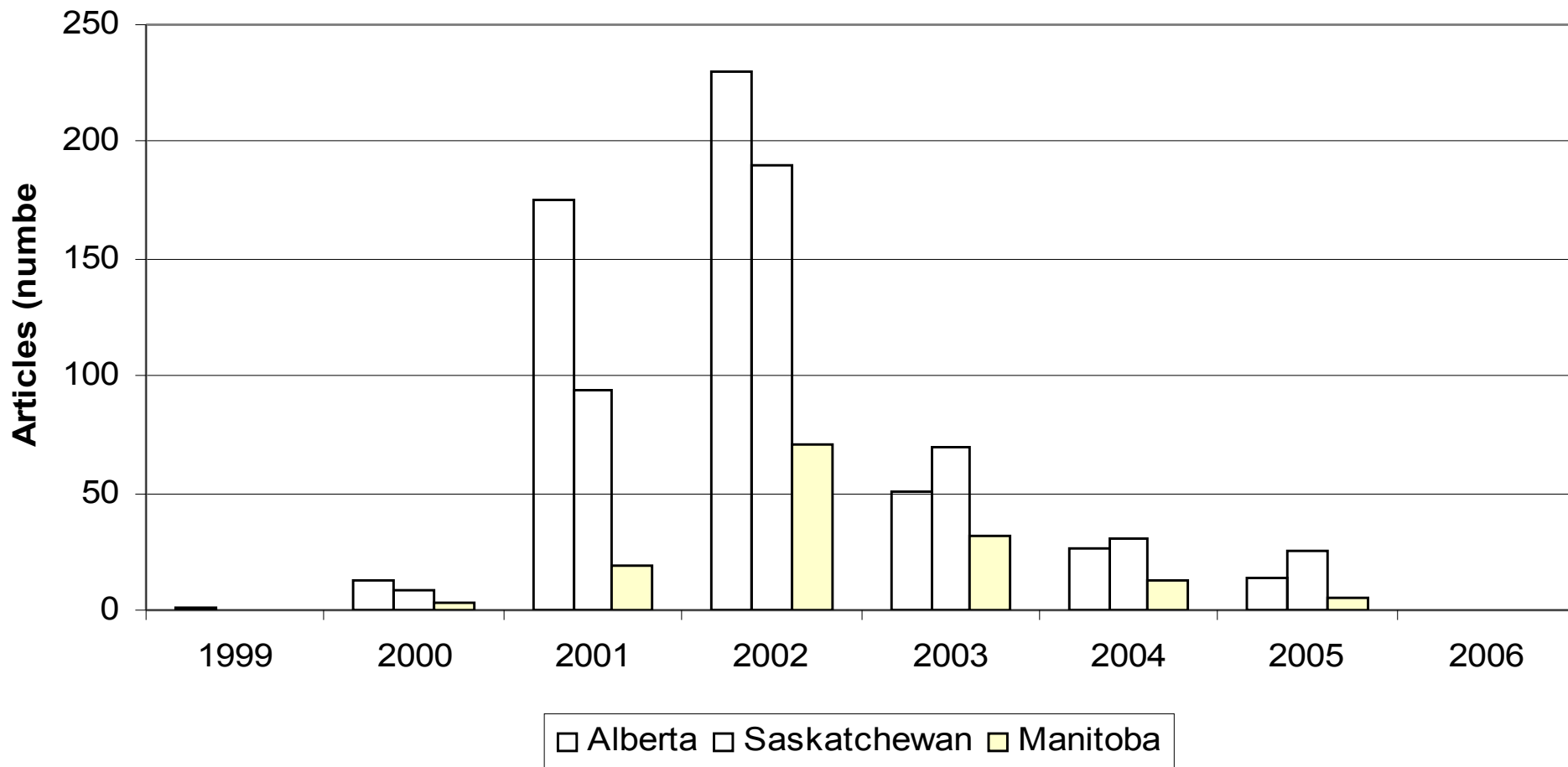
More efficient irrigation systems

Improved business plans

Diversified into production, processing and marketing

Timing of Adaptation Emphasis Prairie Provinces

Adaptations by Year and by Province



What is the effectiveness of adaptation options in reducing the vulnerability of agriculture?

m Determine the **residual negative effects** remaining after adaptation options are applied

Identify, organize and describe limitations of, and **barriers** to various adaptation options

Determine **maladaptation** levels by documenting the types of problems resulting from adaptation measures implemented

Identify **innovative** adaptive option that extend the coping range, and decrease the vulnerability of crop and livestock systems

Water wells and pipelines for drought stricken pastures

Thank you to Bob Buchanan, Agricultural Water Specialist, Leduc District Office #17801 086.

source. The cost of the pipe and shallow burial of it ranges in most cases from \$0.50 to \$1.00 per foot. So

What to do to drought proof your farm water supply?

To improve the supply of water on your farm, there are several alternative options. The most common is to use an existing well and pressure system to supply water via pipeline to the pastures. In some cases, the least costly alternative is to use an existing well and pressure system to supply water via pipeline to the pastures. The main principle here is to develop a dependable well water supply and then make maximum use of it with a pressurized system.

Locals looking for drought solutions

Drought forces ranchers to sell early

In a normal year, the area east of Lacombe, Alta., receives about 580 millimetres of rain. So far this year, it has received 25 mm.

By Barbara Duckworth

CRESTMERE, Alta. — Back-to-back droughts have forced a central Alberta rancher to make the toughest decision of his career. The severity of this drought forced Brian Luce of Crestmere to sell animals, find alternative feed supplies and cut back his custom grazing operation. "Last year we had a kind of normal precipitation and so we decided to slow our animals down because we had very little regrowth," Luce told a group attending the Western Forage Beef Group pasture school in Lacombe, Alta.

"I didn't want to be feeding in the growing season. It is very hard to feed your way out of a drought." The weather became hot and windy and they sold the steers in mid-June. "That is the first time ever that we had to ship cattle out of here because of lack of feed," he said. The grass will be left to rest and may be used to feed cows later. A late spring snow filled the dogpats so the water supply should hold even if the grass does not. Luce's pastures are divided into carefully managed cells with a number of smaller paddocks that he sizes according to a formula based on the number of cattle and forage production. He bases his calculations on 10 years worth of pasture records. One of his grazing cells contains about 1,000 acres. Electric wires divide it into 42 paddocks. A cell normally supports 700 yearlings and 100 cows.



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Farming practices difficult to change

By Barbara Duckworth

Mitchell interview Alberta farmers. "Some people preferred to watch their neighbours," he said. Mitchell and Ambar also found many farmers held firm ideas about

Plan suggested to help livestock producers affected by drought

Dear editor, Contrary to what the NDP Agriculture Minister may think, much of Saskatchewan is in a full-blown drought. The drought will be shared by the provincial and federal governments and livestock producers. Projects will be

Barley an option despite drought, says expert

Some Possible Water Futures (Canada in a Changing Climate 2007)

- m Increased drying due to increased temperatures, and ice free season, etc.
- Decreased water supplies
- Increased societal demands on water resources and conflicts
- Increases in water scarcity represent the most serious climate risk

