

Economic Value of Irrigation in Alberta

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- **Funded by Growing Forward 2**

Future World Food Requirements

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- ❑ **Global population is currently 7 billion, and is expected to grow to at least 9 billion by 2050.**
 - ❑ **World food requirements may need to double in the next 30 years.**

Irrigated Food Production

- ❑ Irrigation makes up nearly 20% of the world's agriculture land base (~300 million ha).
- ❑ However, it produces nearly 40% of the world's food.
- ❑ Up to 80% of future food requirements may need to be met by irrigation.



Ethiopia



India



Alberta

Feeding the World

❑ Only 5 countries currently have the potential to significantly increase food production:

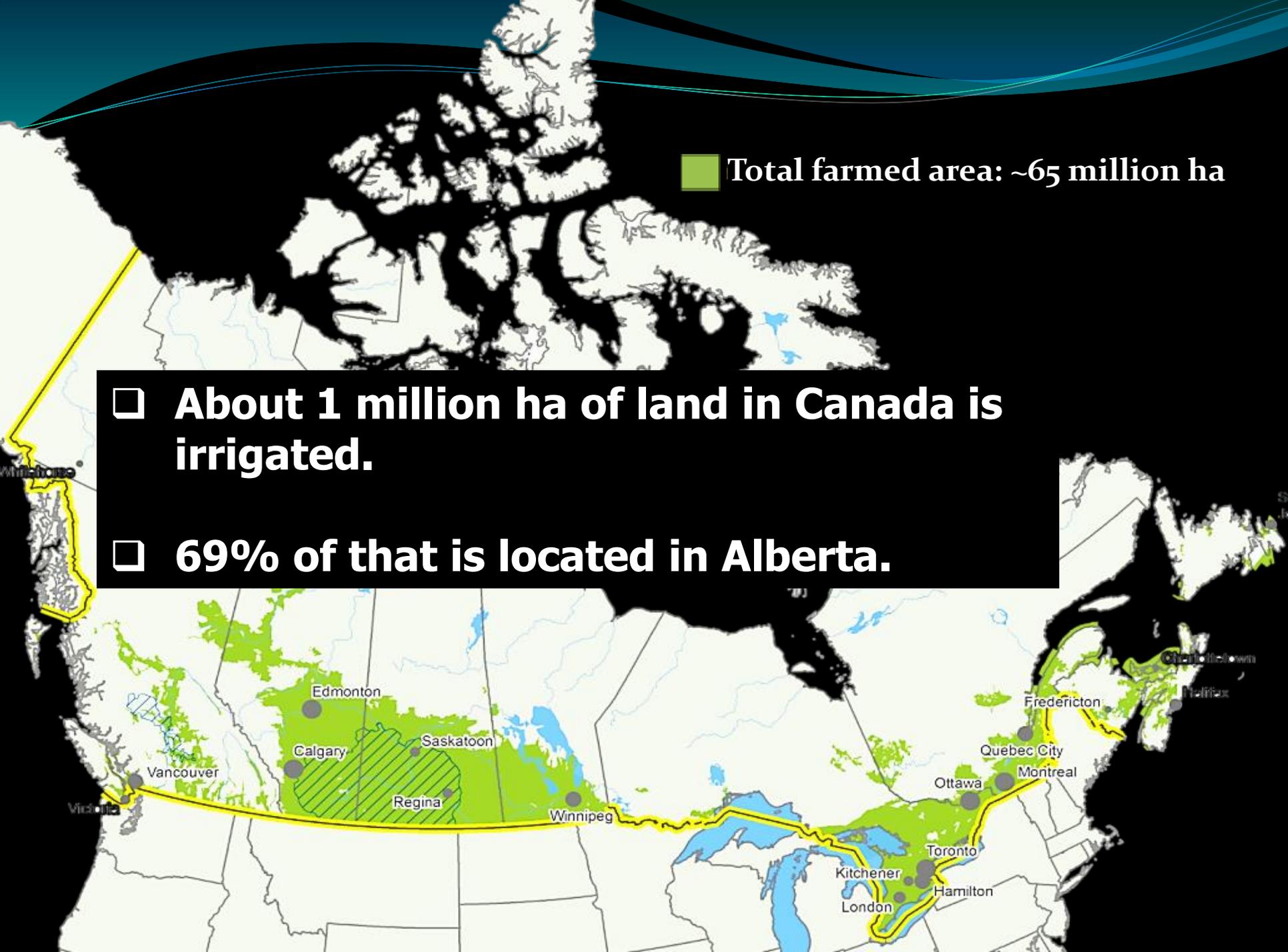
- ❖ Argentina;**
- ❖ Brazil;**
- ❖ Canada;**
- ❖ Russia; and**
- ❖ USA.**

❑ Sufficient land and water;

❑ Suitable climate;

❑ Reliable infrastructure; and

❑ Efficient commercial and financial services.



■ Total farmed area: ~65 million ha

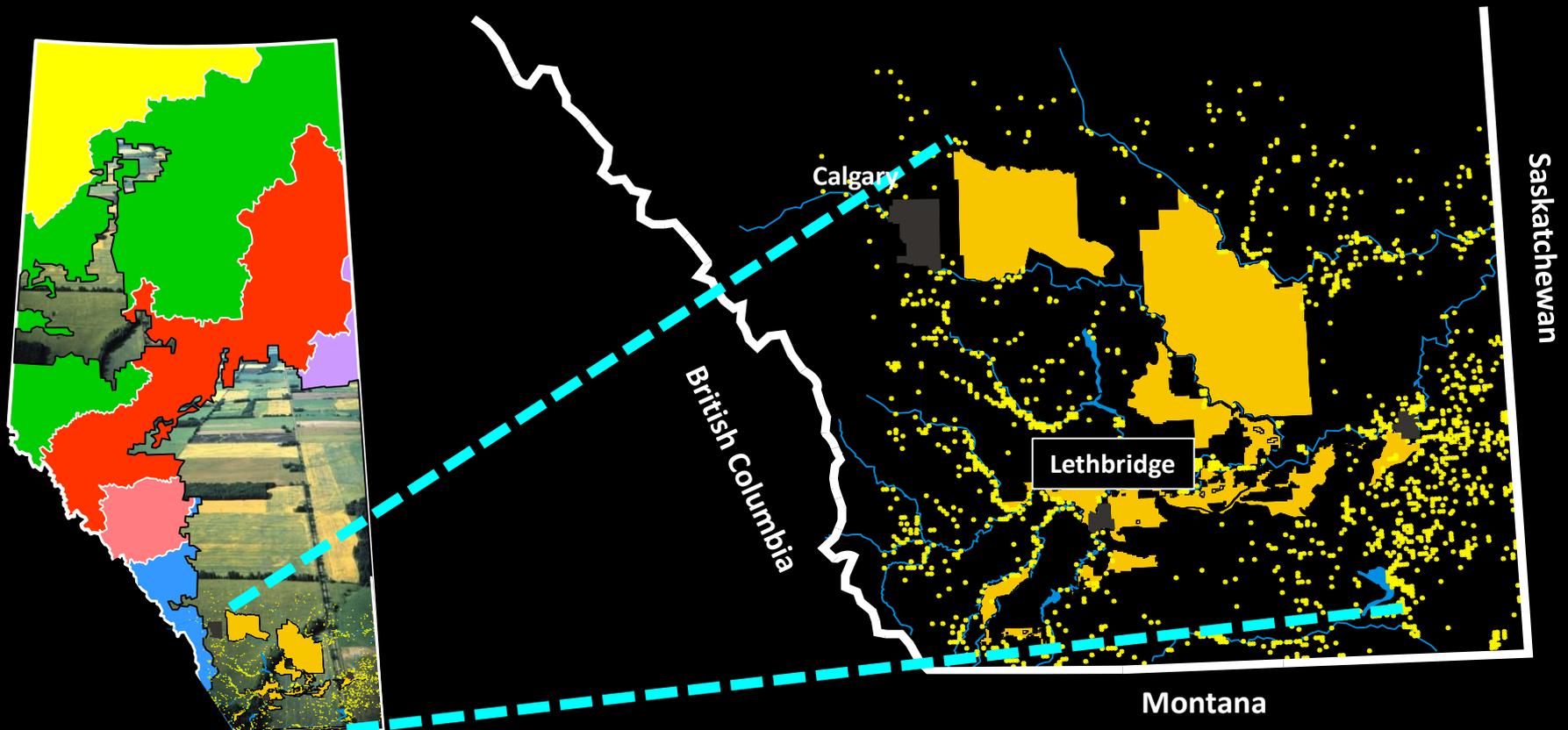
□ About 1 million ha of land in Canada is irrigated.

□ 69% of that is located in Alberta.



Irrigation in Alberta

- ❑ About 690,000 ha of land irrigated.
- ❑ Approximately 5% of Alberta's cultivated land base.
- ❑ 98% of irrigation occurs in the SSRB.



Economic Impact of Irrigation in Alberta

- ❑ **Irrigation plays a significant role in Alberta's agricultural and economic landscape.**

- ❑ **Several studies have documented the economic impacts of irrigation in Alberta.**
 - ❑ **UMA, 1984**
 - ❑ **UMA, 1993**
 - ❑ **Hart Water Management , 2001**
 - ❑ **Irrigation Water Management Study Committee, 2002.**

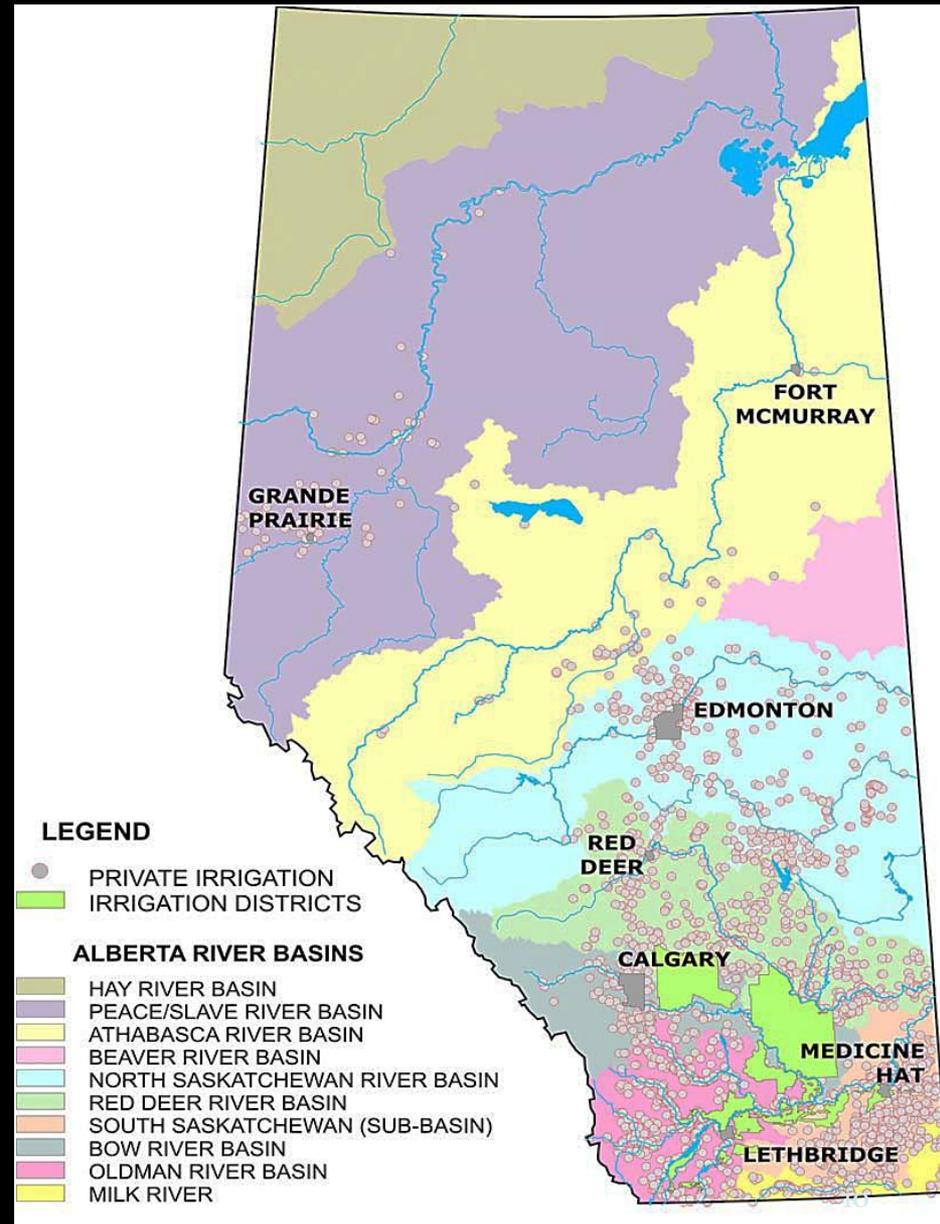
- ❑ **Much has changed since the last major economic study was completed.**

Current Study Objectives

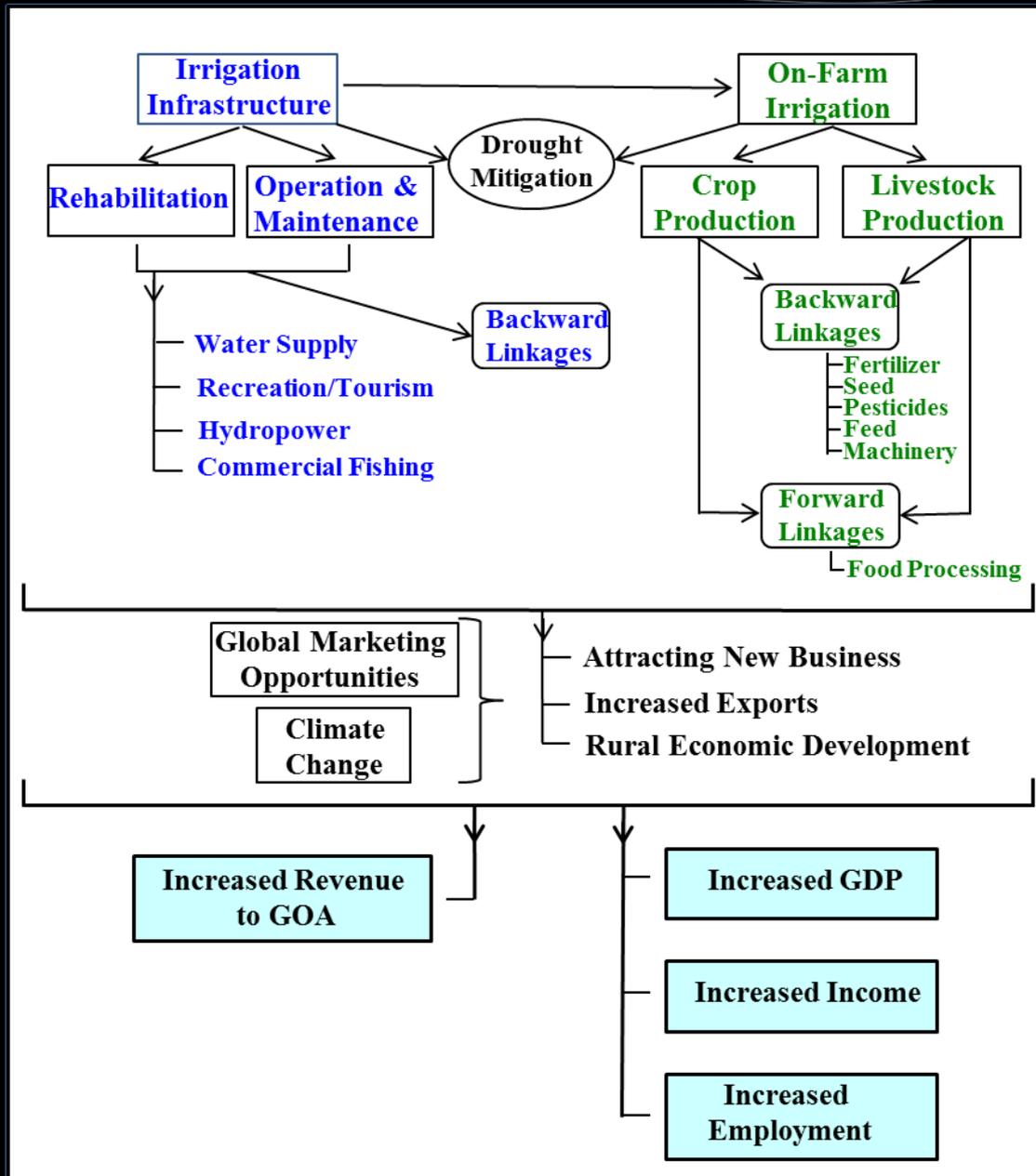
- ❑ Provide an up-to-date assessment of the value of Alberta's irrigation industry.**
- ❑ Better understand the current and future role of irrigation in Alberta's economic landscape.**
- ❑ Assess the impact of irrigation on the social well-being of Albertans.**

Study Area

- ❑ Total Irrigated Area is ~ 690,000 ha
 - ❑ 566,000 ha in Irrigation Districts.
 - ❑ 124,000 ha in Private.
- ❑ Actual Irrigated Area (2000 – 2011) was 600,795 ha
 - ❑ 491,017 ha in Irrigation Districts.
 - ❑ 109,778 ha in Private.



Linkages to Economic Assessment



Impacts Assessed

- ❑ **Direct impacts of farm-level irrigation activities.**
 - ❑ **Value of sales and employment.**



- ❑ **Indirect impacts through backward linkages.**
 - ❑ **Sale of inputs (fertilizer, seed, machinery, services).**



- ❑ **Induced impacts through backward linkages.**
 - ❑ **Businesses that sell inputs support other industries.**



Impacts Assessed (cont.)

- ❑ **Indirect impacts through forward linkages.**
 - ❑ **Processing of irrigation products.**

- ❑ **Induced impacts through forward linkages.**
 - ❑ **Processing industries**

- ❑ **Other quantitative or qualitative impacts.**
 - ❑ **Recreation, Hydropower, Habitat development**



Economic Analysis

- ❑ **Three interlinked computer models were developed and used.**

- ❑ **Irrigation Benefits Simulator Model (ISBM)**
 - ❑ Assessed farm-level economic impacts of irrigation.

- ❑ **Alberta Regional Input-Output Model (ARIOM)**
 - ❑ Assessed secondary economic impacts of irrigation.

- ❑ **Fiscal Impact Analysis Model (FIAM)**
 - ❑ Assessed fiscal impact on the GOA and GOC resulting from irrigation-related activities.

Economic Analysis

- **Irrigated crop and livestock production.**
- **Backward and forward linkages to crop and livestock production.**
- **On-farm investment in machinery and equipment.**
- **Infrastructure rehabilitation, operation, and maintenance.**
- **Drought Mitigation.**
- **Recreation.**
- **Hydropower generation.**
- **Commercial fishing**
- **Non-irrigation water use.**

Qualitative Assessments

- ❑ **Habitat Development**
- ❑ **Diversification**
- ❑ **Rural Development**
- ❑ **New Business Opportunities**
- ❑ **Climate Change**



Results

Irrigated Crop and Livestock Production

- ❑ Irrigated crop and livestock sales totaled about \$1.4 billion/year.
- ❑ 4.7% of Alberta's cultivated land base generated 19% of the total provincial sales.
- ❑ Irrigation sales equated to about \$2,400/ha, compared with \$329/ha for dryland – about 7 times greater.



Agricultural Processing

- ❑ Irrigation-related agriculture processing generated about \$2 billion in total sales.
- ❑ This was about 18% of the total provincial food processing sales.
- ❑ Irrigation-related agricultural processing provided:
 - ❑ \$1.7 billion to the provincial GDP;
 - ❑ \$1.0 billion in labour income; and
 - ❑ 17,000 jobs



Irrigation Infrastructure and Government Revenue

- **Operation, maintenance and rehabilitation of irrigation infrastructure in southern Alberta generated about 1.3 billion in revenue for the GOA and GOC.**
- **Government revenue always exceeded irrigation-related expenditures, with a Revenue to Expenditure ratio of about 3:1.**



Total Economic Impacts

- ❑ **Alberta's irrigation industry annually generated:**
 - ❑ **\$3.6 billion to the provincial GDP;**
 - ❑ **\$2.4 billion in labour income;**
 - ❑ **56,000 jobs.**

- ❑ **GDP multipliers:**
 - ❑ **Every \$1.00 of irrigation sales increased the GDP by \$2.54, and labour income by \$1.64.**
 - ❑ **Every m³ of water delivered for irrigation and other related uses generated about \$3.00 to the provincial GDP and \$2.00 in labour income.**
 - ❑ **Every \$1.00 invested by the GOA generated \$3.00 in added revenues.**

Irrigation's Contribution to the Agri-Food GDP

- ❑ Alberta's irrigation contributed about 20% of the total provincial agri-food sector GDP.**
- ❑ Almost 90% of the benefits accrued to the region and province, and only 10% to irrigation producers.**
- ❑ Earlier studies showed an 86 : 14 breakdown in benefits.**

Future Opportunities/Challenges

Climate Change

- ❑ **Increased crop diversification (increasing temperature)**
 - ❑ **Corn (silage and grain) and soybeans.**
 - ❑ **Increased yields of many crops possible (e.g. alfalfa).**



Future Opportunities/Challenges

Climate Change

- ❑ Water Supply and Management**
 - ❑ Climate models are not conclusive, but there is consensus that summer flow in SSRB rivers will be less.**
 - ❑ Potential river flow reductions of -20% (-8% to -24%).**
 - ❑ Increased temperatures will likely increase water demand by crops.**

 - ❑ Future irrigation expansion and water management strategies should take into account water supply and increasing water demands.**

Future Opportunities/Challenges

Climate Change

❑ Droughts

- ❑ Intensity and duration may increase.**
- ❑ Current reservoir storage and management provides water for 1 or 2 drought years.**
- ❑ Storage on the Colorado River system provides water for at least 4 drought years.**
- ❑ A long-term drought strategy should be developed for the Irrigation Districts.**
- ❑ Increased storage capacity would help mitigate the impacts of sustained droughts for all water users.**



Future Opportunities/Challenges

Market Changes

- ❑ **Global food demand is increasing.**
 - ❑ **China, India, and Southeast Asia are key growth regions.**

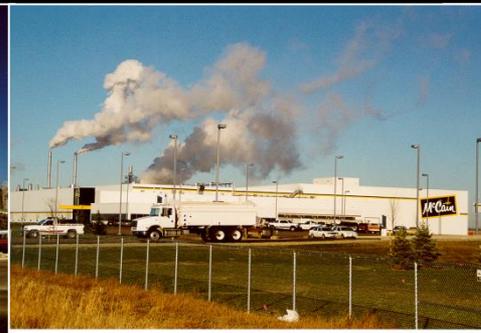
- ❑ **Future food demand will focus more on:**
 - ❑ **Meat and meat products ;**
 - ❑ **Processed foods;**
 - ❑ **High quality foods; and**
 - ❑ **Environmentally sustainable food products.**

- ❑ **This provides good opportunities for Alberta's irrigation industry.**

Future Opportunities/Challenges

Value-Added Processing

- ❑ Processing of irrigation crop and livestock products add significant value of the irrigation industry.**
- ❑ Irrigation Districts have the necessary water, land, skilled irrigation producers, and produce high quality products.**
- ❑ Attracting new agri-food processing industries to southern Alberta should be a priority.**
- ❑ Partnerships (e.g. GOA, Irrigation Districts, Southgrow) are needed to communicate this message outside Alberta.**



Conclusions

- ❑ **Irrigation productivity and water use efficiencies have improved significantly in the past 15-20 years.**
- ❑ **Irrigation continues to play a key role in helping grow the Alberta economy.**
- ❑ **Communities related to the irrigation industry demonstrate what a strong, vibrant rural economy can achieve.**
- ❑ **Increasing world food demand will provide even greater economic opportunities for Alberta's irrigation industry.**
- ❑ **Water supply and water management will continue to be important challenges for the Irrigation Districts and the irrigation industry.**

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IEC Conference – Saskatoon, Saskatchewan



- ❑ ***The Canadian National Committee on Irrigation and Drainage (CANCID) will host an international irrigation conference in Saskatoon in 2018.***
- ❑ ***400 -500 delegates are expected, representing 60+ countries.***
- ❑ ***Part of the conference will include a tour of Alberta's irrigation area.***

