

University of  
Lethbridge



**Lethbridge**  
College

# THE WATER-FOOD RESEARCH NEXUS

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AIPA CONFERENCE, LETHBRIDGE, ALBERTA, CANADA

# THE GRAND CHALLENGE ...

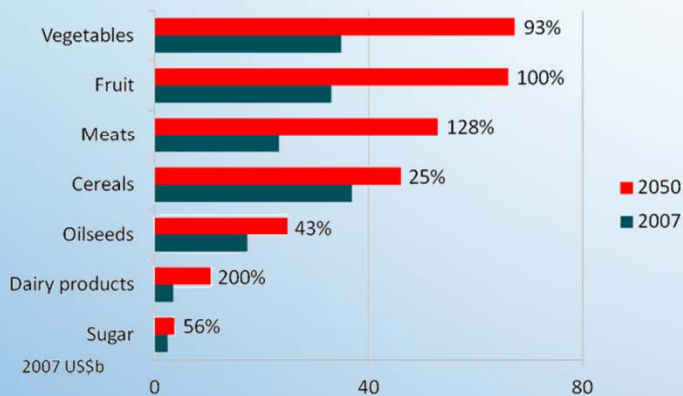
- GLOBAL POPULATION IS EXPECTED TO REACH 9 BILLION + BY 2050 (CURRENT NET POPULATION GROWTH IS EQUAL TO ADDING A NEW YORK CITY-SIZED POPULATION EVERY OTHER MONTH).
- WATER & LAND RESOURCES ARE LIMITED, GLOBAL CHANGE IS ALTERING DISTRIBUTION AND EXPERIENCE.
- DEMAND FOR FOOD AND NUTRITION COULD DOUBLE & TOTAL ENERGY DEMAND COULD TRIPLE DURING THIS PERIOD OF TIME.
- *MORE THAN 55% OF GLOBAL POPULATION WILL BE MIDDLE CLASS, LIVING IN MEGA-CITIES AND WITH \$60 TRILLION IN PURCHASING POWER.*

## ○ SOME GIVENS (OR ASSUMPTIONS) ...

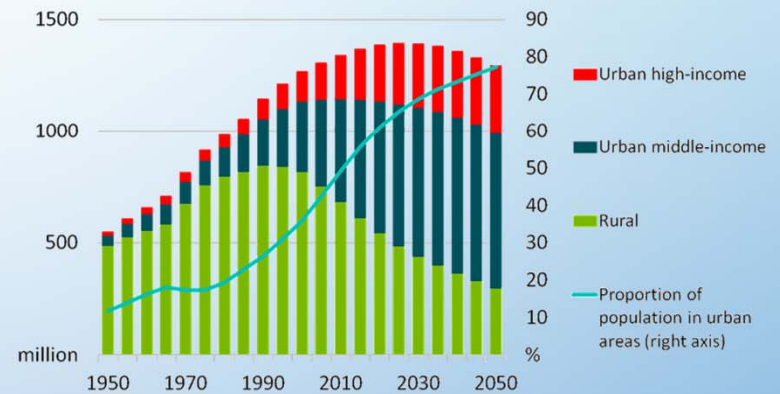
- INCREASED AFFLUENCE OF CONSUMER MARKETS WILL DEMAND FOOD THAT IS APPETIZING, SAFE, NOURISHING, CONVENIENT TO PREPARE, AVAILABLE IN UNLIMITED QUANTITIES AND AT REASONABLE PRICES.
- ENVIRONMENTAL PERFORMANCE/SUSTAINABILITY IS INCREASINGLY IMPORTANT IN CONSUMER CHOICES (*EVEN IN THE DEVELOPING WORLD*).
- ECONOMIC PROFITABILITY AND ENVIRONMENTAL PERFORMANCE ARE CRUCIAL TO SUSTAINABLE PRODUCTION AND VALUE-ADDED AGRIBUSINESS DEVELOPMENT.

# SOME FORECASTS ...

## Prospects for growth in ASEAN food consumption



## Urban population in China to grow strongly



Source: Caroline Gunning-Trant, ABARES

## SOME SURPRISING STATISTICS ...

1.	UNITED STATES	\$118,281	6.	BELGIUM	\$ 41,133
2.	NETHERLANDS	\$ 79,045	7.	ITALY	\$ 37,075
3.	GERMANY	\$ 70,841	8.	<b>CANADA</b>	<b>\$ 36,965</b>
4.	FRANCE	\$ 68,020		• (LESS THAN ½ OF NETHERLANDS)	
5.	BRAZIL	\$ 55,363	9.	SPAIN	\$ 36,463
			10.	CHINA	\$ 35,903

### Top 10 Exporters of Food/Nutrition in M \$s ...

Source: Global Trade Atlas, 2012

# OPPORTUNITY KNOCKS ...

- **ALBERTA HAS ALL THE ELEMENTS OF AGRICULTURE THAT ARE GLOBALLY RELEVANT ...**
  - ADVANCED IRRIGATION SYSTEMS AND PRODUCTION (ALMOST 70% OF CANADA'S IRRIGATION IS IN SOUTHERN ALBERTA)
  - PRODUCTIVE LIVESTOCK SECTOR
  - EXTENSIVE GRAINS AND OILSEEDS SECTOR
  - EMERGING FIBRES SECTOR
  - ABUNDANT (LOW COST) ENERGY SUPPLIES
  - EXPANDING VALUE-ADDED AGRIBUSINESS SECTOR
  - EXTENSIVE TRANSPORTATION NETWORK

## OPPORTUNITY KNOCKS ...

- SOUTHERN ALBERTA'S HISTORY IS ROOTED IN AGRICULTURE – A PIONEERING ETHIC REMAINS.
- SUCCESSFULLY ADDRESSING ISSUES SUCH AS GLOBAL FOOD AND NUTRITION REQUIRES A TRANSFORMATION (*STEP CHANGE*) IN THE APPROACH TO AGRICULTURE, AGRIBUSINESS AND SUSTAINABILITY.
- **SOUTHERN ALBERTA IS UNIQUELY POSITIONED TO LEAD AND HAVE AN IMPACT IN MEETING THIS CHALLENGE BY CAPITALIZING ON AND BUILDING ON ITS RESEARCH, EDUCATION AND TRAINING STRENGTHS IN COLLABORATION WITH COMMUNITY, BUSINESS AND GOVERNMENT.**

## • DRIVEN BY A BOLD VISION ...

- ALBERTA IS A GLOBALLY RECOGNIZED LEADING (*PREFERRED*) JURISDICTION IN THE SUSTAINABLE PRODUCTION OF HIGH QUALITY, SAFE FOOD AND NUTRITION.
  - ALBERTA'S PRIMARY PRODUCERS OPERATE WITH GLOBALLY RECOGNIZED BEST PRACTICES IN FOOD PRODUCTION AND ENVIRONMENTAL PERFORMANCE.
  - ALBERTA HAS A THRIVING VALUE-ADDED AGRIBUSINESS COMMUNITY FOCUSED ON MEETING THE DEMANDS OF DOMESTIC AND GLOBAL MARKETS.



## INTENTIONAL APPROACH ...

- BRING TOGETHER/INTEGRATE EXPERTISE FROM ACROSS THE UNIVERSITY AND COLLEGE TO EDUCATE STUDENTS (AND PROFESSIONALS) IN AGRICULTURE AND AGRIBUSINESS,
- BUILD ON ESTABLISHED RESEARCH CENTRES AND INSTITUTES, CREATE NEW CENTRES, ENHANCE COLLABORATION AND PARTNERSHIPS WITH COMMUNITY, BUSINESS AND GOVERNMENT,
- ESTABLISH PLATFORMS FOR ADVANCED STUDIES, TRAINING AND RESEARCH TO MEET CHALLENGES BY DEVELOPING NEW PROGRAMMING IN AGRICULTURE AND AGRIBUSINESS WITH GLOBAL IMPACT.

# CENTRE FOR AGRICULTURAL RESEARCH AND AGRIBUSINESS INNOVATION ...

- AGRICULTURAL RESEARCH
  - PLANT AND ANIMAL SCIENCE
  - ENVIRONMENTAL SCIENCE
  - DATA DRIVEN AGRICULTURE
- AGRI-BUSINESS INNOVATION
  - A DYNAMIC CAREER WORTH PURSUING
  - THE FUTURE OF AGRI-BUSINESS
- EMERGING PLATFORM FOR AN ENTREPRENEUR AND INNOVATION PROGRAM (AGRICULTURE IS SEEN AS A CRITICAL ELEMENT)

# AGRICULTURAL RESEARCH ...

- **PLANT AND ANIMAL SCIENCE**

- MEETING GLOBAL NEEDS FOR FOOD AND NUTRITION WILL REQUIRE A CONCERTED (INTENTIONAL) EFFORT IN:
  - IMPROVING YIELD AND QUALITY,
  - DEVELOPING NEW CROPS AND CROP VARIETIES,
  - DEVELOPING ADAPTIVE APPROACHES TO CHANGES IN DISEASE AND PEST CONTROL AND SURVEILLANCE IN FIELD AND HORTICULTURAL CROPS.
- ANIMAL SCIENCE THAT ENABLES IMPROVED NUTRITION AND PROMOTES ANIMAL HEALTH AND WELFARE AND TRACEABILITY WILL ENSURE THAT ALBERTA PRODUCTION WILL BE POSITIONED AS A PREFERRED GLOBAL SUPPLIER OF MEAT PROTEIN.
- FOOD SAFETY WILL BE A KEY DRIVER OF CONSUMER DEMAND AND SUPPLY CHAIN SUCCESS.

# ○ AGRICULTURAL RESEARCH ...

- **PLANT AND ANIMAL SCIENCE (2)**

- FERTILE GROUND FOR SIGNIFICANT EXPANSION OF COLLABORATION AND PARTNERSHIPS BETWEEN ACADEMIC, GOVERNMENT AND INDUSTRY RESEARCHERS.
- ENHANCED OPPORTUNITIES FOR COOPERATIVE EDUCATION PROGRAMMING FOR UNDERGRADUATE AND GRADUATE STUDENTS.
- *MICROBIOLOGY (ENVIRONMENTAL, MOLECULAR, INTESTINAL) , AGRICULTURAL BIOTECHNOLOGY, AQUAPONICS, EPIGENETICS, TRANSGENERATIONAL RESPONSE, PLANT STRESS TOLERANCE AND RESPONSE, PLANT PHYSIOLOGY, BACTERIAL PATHOGENS, DISEASE AND PEST CONTROL-SURVEILLANCE, SOIL BIOLOGY ...*

# ○ AGRICULTURAL RESEARCH ...

- **ENVIRONMENTAL SCIENCE**

- IMPROVED ENVIRONMENTAL PERFORMANCE IN FOOD AND NUTRITION IS BEING DRIVEN GLOBALLY BY CONSUMER DEMAND (ALSO EVIDENCED BY INCREASING PRODUCTION REQUIREMENTS FROM FOOD PROCESSORS AND OTHERS IN PRIMARY PRODUCTION).
- THE ABILITY TO IDENTIFY, MONITOR AND REPORT/VERIFY ENVIRONMENTAL PERFORMANCE IS KEY TO SECURING NEW MARKETS AND MAINTAINING CONSUMER CONFIDENCE.
- INTEGRATED-SYSTEM APPROACHES TO NATURAL RESOURCE MANAGEMENT (PARTICULARLY LAND AND **WATER**) WILL BE NEEDED TO SUPPORT SUSTAINABILITY.

# ○ AGRICULTURAL RESEARCH ...

- **ENVIRONMENTAL SCIENCE (2)**

- INNOVATION FOCUSSED – PRODUCING DOUBLE OR TRIPLE (OR MORE) PRODUCTION WHILE REDUCING/ADDRESSING THE ENVIRONMENTAL IMPACTS OF AGRICULTURAL ACTIVITIES.
- SIGNIFICANT OPPORTUNITIES FOR COLLABORATIVE ACTIVITIES WITH PRODUCERS, PRODUCER ASSOCIATIONS, GOVERNMENT AND INDUSTRY.
- *ECOLOGY (BEHAVIOURAL, COGNITIVE, RIPARIAN), ECOHYDROLOGY, ECOPHYSIOLOGY, RIVER REGULATION AND RESTORATION, WATER MANAGEMENT, WATERSHED MODELLING, WATER POLICY, ECONOMIC INSTRUMENTS (ENVIRONMENTAL ECONOMICS), ECONOMIC GEOGRAPHY, BIODIVERSITY, ECOLOGICAL INTEGRITY, ECOTOXICOLOGY, CLIMATE VARIABILITY AND GLOBAL CHANGE ...*

# ○ AGRICULTURAL RESEARCH ...

- **DATA DRIVEN AGRICULTURE**

- CROP QUALITY AND ENVIRONMENTAL PERFORMANCE ARE DRIVING PRODUCER BEHAVIOUR AND DETERMINING MARKET ACCESS.
- IMPROVED MANAGEMENT OF INPUT COSTS THROUGH PRECISION AGRICULTURAL APPROACHES.
- CRITICAL TO UNDERSTANDING CAPACITY AND REQUIREMENTS FOR NEW CROP TYPES, RESPONSE TO CHANGING CLIMATIC CONDITIONS.
- DEVELOPMENT OF RANGE OF TOOLS-SENSORS FOR MONITORING, DECISION SUPPORT AND MANAGEMENT, IMPROVED YIELD AND QUALITY, TRACEABILITY.

# ○ AGRICULTURAL RESEARCH ...

- **DATA DRIVEN AGRICULTURE (2)**

- STRONG EMERGING INDUSTRY IN SOUTHERN ALBERTA IN THIS AREA – SIGNIFICANT UPTAKE BY PRODUCERS.
- OPPORTUNITIES FOR CREATIVE COLLABORATIONS AND PARTNERSHIPS WITH PRODUCERS, TECHNOLOGY DEVELOPERS, SPECIALIZED AGRICULTURAL SERVICE COMPANIES, GOVERNMENT.
- *SATELLITE, AIRBORNE AND TERRESTRIAL REMOTE SENSING, BIOPHYSICAL ANALYSIS, SPECTRAL MIXTURE ANALYSIS, REFLECTANCE, RIPARIAN ZONES, IMAGE PROCESSING, GIS, LIDAR, UAV, VARIABLE RATE IRRIGATION, DATA VISUALIZATION, DATA MINING, APPLICATION DEVELOPMENT ...*



# AGRIBUSINESS INNOVATION ...

- **A DYNAMIC CAREER WORTH PURSUING**

- ALBERTA'S (CANADA'S) AGRICULTURAL OPPORTUNITIES EXTEND FAR BEYOND OUR PAST TRACK RECORD IN PRIMARY PRODUCTION AND IN THE FUTURE NEEDS TO CREATE MORE VALUE TO BE SUSTAINABLE – A FOCUS ON THE DEVELOPMENT OF MARKET FOCUSSED AGRIBUSINESS.
- SERVE AS A CATALYST FOR INCREASING NUMBER AND DIVERSITY OF INDIVIDUALS CONSIDERING AGRICULTURE AS A PRIME CAREER-BUSINESS CHOICE.
- *AG-ECONOMICS, BUSINESS DEVELOPMENT, ENTREPRENEURSHIP, FINANCE, HUMAN RESOURCE MANAGEMENT, COMMODITY AND FUTURES TRADING, ENTERPRISE RISK MANAGEMENT, BUSINESS MANAGEMENT AND LEADERSHIP*  
...

# AGRIBUSINESS INNOVATION ...

- **THE FUTURE OF AGRI-BUSINESS**

- SPECIFIC FOCUS ON CAPTURING MORE VALUE FROM PRIMARY PRODUCTION THROUGH THE CREATION OF NEW AND GLOBALLY FOCUSED AGRIBUSINESS (MUCH OF THE DEMAND FOR FOOD & NUTRITION WILL COME FROM ASIA, AND WILL NEED TO BE CULTURALLY SPECIFIC).
- SIGNIFICANT OPPORTUNITIES FOR NEW RESEARCH COLLABORATIONS, PARTNERSHIPS AND SYNERGIES WITH BUSINESS-INDUSTRY AND GOVERNMENT.
- *COMPETITIVE MARKET INTELLIGENCE, MARKET ACCESS, INTERNATIONAL BUSINESS PARTNERSHIPS, SME DEVELOPMENT, TRANSPORTATION AND SUPPLY (FRESH) CHAIN LOGISTICS AND SOCIAL LICENSE ...*

## AGILITY & AEIR ...

- NEW PROGRAMMING THAT FOCUSSES ON ENTREPRENEURIAL AND INNOVATION TRAINING, EXPERIENCE AND SUCCESS HAS BEEN LAUNCHED.
- IT IS EXPECTED THAT AGRICULTURE AND AGRIBUSINESS WILL PROVIDE AN IDEAL LANDSCAPE TO DRIVE OPPORTUNITIES FOR STUDENTS ENGAGED IN THESE ACTIVITIES.
- OPPORTUNITIES WILL CAPITALIZE ON ACTIVITIES ACROSS ALL OF THE THEMES AND EXPERTISE CLUSTERS IN THE CENTRE FOR AGRICULTURAL RESEARCH AND AGRIBUSINESS INNOVATION (CARAI).

# INDUSTRY ENGAGEMENT ...

- **SOME TRANSFORMATIONAL ACTIVITIES ARE ALREADY UNDERWAY ...**
  - COR VAN RAAJ CENTRE FOR AGRIBUSINESS INNOVATION, \$5M INVESTMENT (SHARED BETWEEN THE U OF L AND LETHBRIDGE COLLEGE)
    - \$1M FOR ENDOWED STUDENT AWARDS (50-50)
    - \$2M FOR ACADEMIC PROGRAMMING (50-50)
    - \$1M FOR ENTREPRENEURSHIP AND INNOVATION PROGRAMMING AT THE UNIVERSITY OF LETHBRIDGE
    - \$1M FOR AGRICULTURE ENTREPRENEUR IN RESIDENCE PROGRAM AT LETHBRIDGE COLLEGE
  - FUNDING HAS BEEN MATCHED!

# INDUSTRY ENGAGEMENT ...

- **SOME TRANSFORMATIONAL ACTIVITIES ARE ALREADY UNDERWAY ...**

- POTATO GROWERS OF ALBERTA, MCCAIN FOODS, CONAGRA LAMB WESTON, CAVENDISH FARMS (\$1M INDUSTRY FUNDED RESEARCH CHAIR IN POTATO SCIENCE)
- FOCUSED ON IMMEDIATE AND LONG-TERM NEEDS OF POTATO INDUSTRY.
- DESIGNED TO “ADD CAPACITY” TO RESEARCH EXPERTISE IN ALBERTA.
- NEW CHAIR IN POTATO SCIENCE ARRIVES JANUARY 2016.
- FUNDING HAS BEEN MATCHED!

# INDUSTRY ENGAGEMENT ...

- **SOME TRANSFORMATIONAL ACTIVITIES ARE ALREADY UNDERWAY ...**
  - LLOYD AND DOROTHY MUELLER GIFT OF \$3.1M TO ESTABLISH THE MUELLER APPLIED RESEARCH CHAIR IN IRRIGATION SCIENCE
  - PROGRAM FUNDING TOPPED UP BY LETHBRIDGE COLLEGE TO BRING CHAIR PROGRAM UP TO \$5M.
  - RECRUITMENT OF CHAIR TO BE FINALIZED IN JANUARY 2016.

# EXTERNAL ENGAGEMENTS ...

- STRONG PARTICIPATION FROM AAFC AND AAF, ADJUNCT APPOINTMENTS, BENEFITS TO BE EXPANDED BY FORMALIZING ARRANGEMENTS.
- STRONG CONNECTIONS TO OTHER CAMPUS ALBERTA EXPERTISE (COLLEGES AND UNIVERSITIES).
- SIGNIFICANT OPPORTUNITIES FOR INTERNATIONAL RESEARCH, EDUCATION AND TRAINING OPPORTUNITIES, FACULTY AND STUDENT EXCHANGES, INTERNATIONAL RECRUITMENT, SUCH AS;
  - WAGENINGEN UNIVERSITY (NETHERLANDS)
  - HELMHOLZ (POTSDAM, LEIPZIG)
  - UNIVERSITY OF CALIFORNIA (DAVIS)
  - UNIVERSITY OF IDAHO
  - OTHERS

# • COLLABORATION & PARTNERSHIPS ...

- LONG-TERM SUCCESS WILL BE INFLUENCED BY THE CONNECTIONS BETWEEN THE UNIVERSITY, THE COLLEGE AND THE AGRICULTURAL INDUSTRY – PRODUCERS, PRODUCER ORGANIZATIONS, FOOD PROCESSORS, TECHNOLOGY DEVELOPERS AND OTHERS.
- WE VALUE YOUR SUPPORT, ADVICE, COLLABORATION AND ONGOING INPUT AND ENGAGEMENT.
- QUESTIONS? COMMENTS!