

# **Farm Structures: Lessons Learned & Opportunities for Improvement**

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# CFBA Objectives

- Promote and advance the construction of structurally sufficient, environmentally sound, efficient farm buildings in Canada
- “ **Build them right (and tell others about it)** ”
- Promote and advance the standards of farm structures through research, education and practical applications
- “ **Be a leader in finding solutions** ”
- Represent the Association in legislation proposals, codes, safety, labour and other matters administered by governments
- “ **Make this how everyone does business** ”



CHANGE

# Climate Change



# Climate Change Strategy

- **Mitigation**

Source reduction in greenhouse gas emissions over the long-term.

- **Adaptation**

Changing activities and processes to lessen negative impacts of climate change that are already or expected to occur.

# Climate Change Mitigation

- Improve livestock production efficiency by improved indoor environment
- Reduce fossil fuel consumption by using efficient motors, fans and lighting systems
- Adopt and integrate renewable energy systems, including geothermal, wind, solar and biogas
- Reduce anaerobic conditions in manure storages and management systems
- Capture methane from manure storages for electricity production

# Climate Change Adaptation

- Extreme Temperatures
  - Heating and ventilating system reaction time
  - Relationship of these systems to building envelope
  - Building material selection
- Changes in Water Availability
  - Reduce water use and increase system reliability

# Climate Change Adaptation

- Extreme Storm Events
  - Effect of increased precipitation volume on site preparation, manure storages?
  - Load effects of higher snow loads and drifting?
  - Load effects of increased wind pressures?
- Example: Loose sow housing in naturally ventilated barn – A step in the right direction



# Addressing Climate Change

Be a leader in finding solutions!

- Experience
- Research
- Development of New Systems
- New uses for Existing Systems
- A CHANGE IN MINDSET

# Fire Safety



Source: Farmers Forum

# Barn Fires have Significant Costs!

- Loss of life or injury (both human and livestock)
- Infrastructure loss and disposal
- Deadstock removal and disposal, and environmental impacts
- Loss of capital investment in infrastructure and livestock
- Loss of income and income stability
- Loss of jobs
- Increased insurance costs
- Negative public perception

# Challenges in Livestock Facilities

- Low human occupancy, but high animal occupancy
- Unique atmosphere (high moisture, corrosive/flammable gases, dust)
- Animal waste products
- Intensive washing usually required (biosecurity)
- Possible freezing temperatures
- Large undivided areas for livestock and equipment movement
- **GETTING LARGER AND LARGER!!**

# “ Pillars of Fire Safety ”

Fire Prevention

Early Warning & Detection / Evacuation

Fire Suppression

Fire Safety



# Fire Prevention

## Mechanical or Electrical Failure

- Centralized equipment
- Protection of components
- Components that resist degradation
- Planned obsolescence



Source: ESA

# Fire Prevention

## Design & Construction Practices

- Limit combustible materials
- Safety features on appliances
- Design to limit indirect effects

## Maintenance!!!

- Education and awareness
- Minimal maintenance systems
- Protection of fire safety systems
- Maintenance services on contract

# Early Warning & Detection / Evacuation

Existing Tools – Can they be Adapted for Barns?

- Fire alarms
- Sprinklers
- Heat and smoke detectors
- Remote monitoring
- Travel distance & Means of egress
- Rated building assemblies
- Emergency lighting, exit signage
- Fire extinguishers



# Fire Suppression

Limit the Effects of Fire at Planning Stage:

Fire Department Needs

- Access routes
- Water Supply
- Low flame spread & smoke developed ratings

Reduce Fire Spread

- Compartmentalization & Rated Assemblies
- Fire stops, fire dampers, control interlocks
- Spatial Separation

# Sustainability

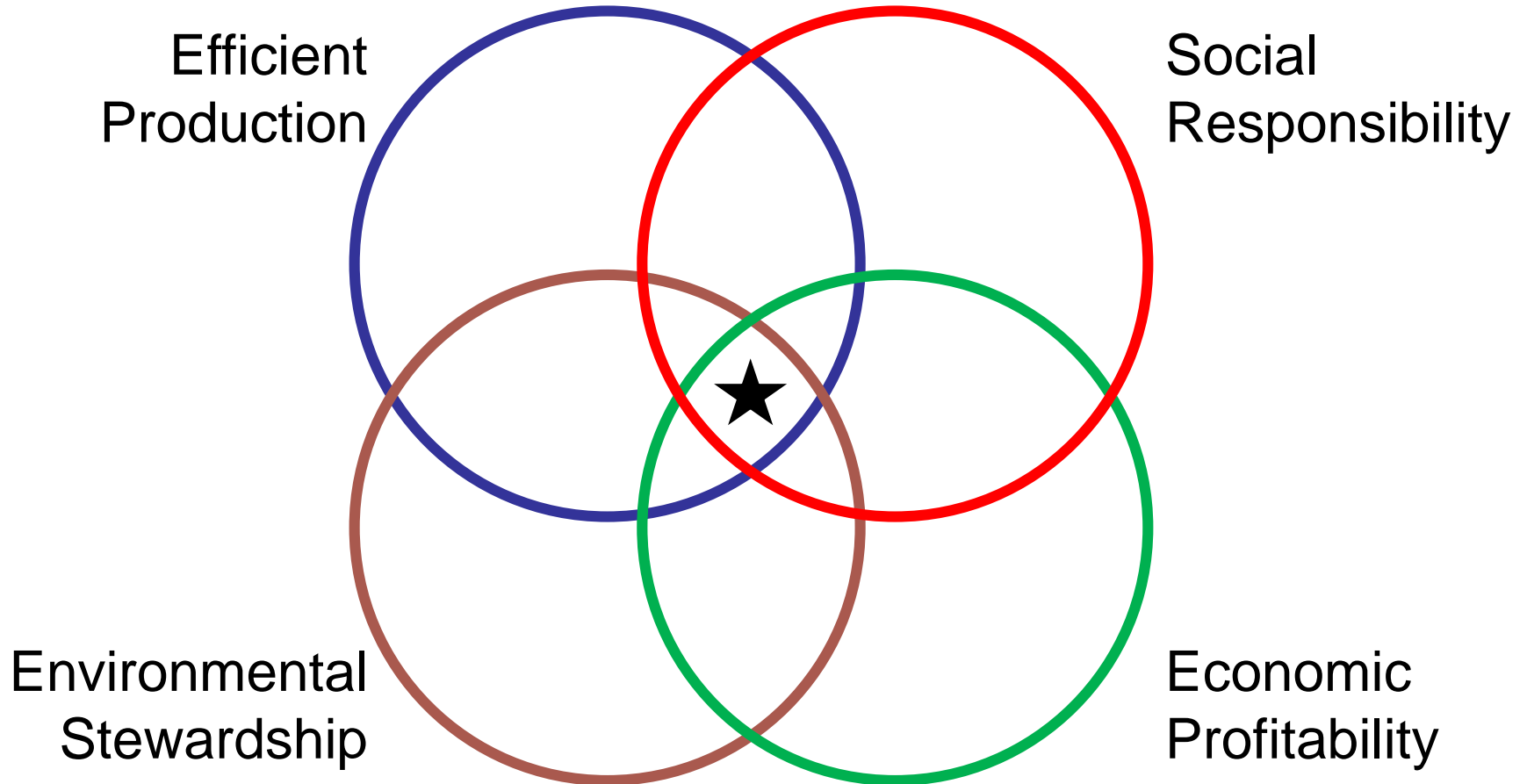
- A key philosophy in the development of solutions to all issues affecting the agricultural industry

# Sustainability

“ Sustainable agriculture is the efficient production of safe, high-quality agricultural product, in a way that protects and improves the natural environment, the social and economic conditions of the farmers, their employees and local communities, and safeguards the health and welfare of all farmed species. ”

Sustainable Agriculture Initiative Platform (2010)

# Sustainability = Balance



# Efficient Production

Farm Buildings support production efficiency

- Efficiency improvements in farm buildings must accommodate other existing production practices

and

- Development of tools to support efficiency advances in other areas of production

# Environmental Stewardship

Strive for solutions that have neutral or positive effects on air, water, soil, other natural resources

- Water saving measures
- Manure storages
- Power efficiency
- GHG reduction
- Odour control
- Materials selection

# Social Responsibility and Values

Public concerns:

- Where their food comes from
- How it was raised
- Safeguards / security
- Animal welfare
- Worker conditions
- Sustainable sourcing of agricultural products

Transparency, Education, Active Change

Ignoring Social Responsibility = Economic Impact

# Economic Profitability

- For sustainable agriculture, requires a change in mindset
- Profit includes tangible & intangible elements:
  - Economic Gain
  - Environmental Stability
  - Social Benefit
- Life-Cycle Cost a significant consideration related to economic profitability



# Example: A Step in the Right Direction

Loose sow housing, naturally ventilated barn

- Efficient Production
  - ESF for efficient feeding
  - Open penning and layout of walls assist with lowering stress of sows, while providing some control over sow movement
  - Improved animal condition
  - Improved farrowing, piglet health

# Example: A Step in the Right Direction

Loose sow housing, naturally ventilated barn

- Environmental Stewardship
  - Natural ventilation requires minimal electricity
  - No supplemental heat = no GHG emissions
  - Ventilation controls (rain sensors, wind sensors) respond to weather changes to maintain indoor environment
  - Efficient watering system
  - Further innovation for manure system could improve facility

# Example: A Step in the Right Direction

Loose sow housing, naturally ventilated barn

- Social Responsibility
  - Loose sow housing allows increased freedom of movement and natural expression/traits
  - Environmental aspects are palatable to public

# Example: A Step in the Right Direction

Loose sow housing, naturally ventilated barn

- Economic Profitability
  - Capital cost comparable to conventional facility
  - Increased farrowing success & piglet health
  - Lowered operational costs
  - Environmental and social profitability

## Example: A Step in the Right Direction

Loose sow housing, naturally ventilated barn

- Addresses some aspects of climate change mitigation/adaptation and animal welfare
- Further improvements in high level areas could make this system more attractive in future

# Sustainability = Balance

- Be a leader in finding solutions that:
  - Support efficient production
  - Preserve environment and natural resources
  - Demonstrate social responsibilities and values
  - Improve economic profitability
- Easy to make this how everyone does business

# Partners in Positive Change

- As agriculture continues to grow, new challenges will be presented
- Partners
  - Farmers
  - CFBA
  - OMAFRA
  - Fire & Building Officials
  - Insurance Companies
  - Researchers
- Research, testing, demonstration, implementation

# Partners in Positive Change

CFBA is committed to:

- Building them right
- Being a leader in finding solutions
- Making this how everyone does business

Committed to CHANGE!