Alberta produces large quantities of agricultural crops and residues that could be used as feedstock for an emerging bioenergy industry (Figure 1) (Statistics Canada, 2018).

The sustainable biomass supply and other economic factors (e.g., the plant’s road network accessibility) are key considerations in selecting potential biorefinery sites (Thomas et al., 2013).

- A number of previous studies have investigated potential biorefinery sites (e.g., Argo et al., 2013; Eksioglu et al., 2009; Gonzales and Searcy, 2016; and Sultana and Kumar, 2012);
- We build on the previous work and conduct a GIS-based analysis in Alberta at a high spatial resolution (i.e., 9.7km × 9.7km, the township level) and with residues from four major crops (barley, canola, oats, and wheat).

AIMS AND OBJECTIVES

- Examine the spatial distribution of available feedstocks and some economic considerations, with the aim of identifying possible future biorefinery sites.
- Some economic considerations:
  - Road network accessibility (Zhang et al., 2011)
  - Supply radius (Gonzales and Searcy, 2017)
  - Economies of scale for residue processing (Muth et al., 2013)
  - Workforce availability (Zhang et al., 2011)

DATA AND METHODS

DATA: 2015 township level crop residue data (including barley, canola, oats, and wheat) from the Bio-Resource Management System (BRIMS).

CONCEPTUAL FRAMEWORK

- Available Biomass
  - Crop production
  - Crop residue (agro-waste crop residues and forest residue)
  - Soil conservation needs

- Accessible Biomass & Suitable Sites for Biorefineries
  - Road network accessibility (time away from road)
  - Supply radius (10, 25, 50, and 80km)
  - Economics of scale for residue processing for plants (1.3-3.3 Mt/year)
  - Workforce availability (residents or nearby residents that are within the supply radius having population of 1,000 or greater)

REFERENCES

- Gonzales, D. S., and Searcy, S. W. 2017. GIS-Based Allocation of Herbaceous Biomass Resources in Bioenergy and Biofuels: REV 1.0.1
- Statistics Canada. 2018. Enrolment Areas, Total Production, Average Farm Price and Total Farm Value of Principal Field Crops, in Metric and Imperial Units. CANSIM Data 106-0017.