

# Biomass Crops

## A Chicken and Egg Story

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There have been several attempts to introduce biomass crops into the Province. However, this type of crop has never really taken off in Nova Scotia. There are number of reasons for this, one being a “chicken and egg” problem.

There are several categories of biomass crops. So-called “first generation” biomass crops are basically food crops rich in sugar, starch or oil that can be repurposed for the production of biofuels - e.g. biodiesel and bioethanol, or other bioproducts – everything from particle board to precursors for “renewable plastics.” First-generation biomass crops include corn, sugar cane, canola, soybean, and wheat. Although the technology to convert first-generation biomass crops into biofuels is well developed, the capital costs of building a “biorefinery” to produce these biofuels is expensive – in the 10’s or 100’s of millions of dollars. However, the greatest issue with first-generation biomass crops is the “food versus fuel debate.” Namely, should we be using top-quality agricultural land and food-quality crops to make fuel? Some think not - for social, economic and environmental reasons. For example, some studies indicate that producing bioethanol as a transportation fuel from corn does little to nothing to actually decrease greenhouse gas emission compared to making gasoline from petroleum.

Another category of biomass crops is the so-called “second-generation or “advanced” biomass crops. These are fast-growing grass and tree species such as switchgrass, Miscanthus, hybrid-poplar and willow. In the case of the trees, they are grown as short-rotation, coppiced crops - the trees

are grown close together and are cut back to just above the ground in the establishment year. The trees respond to coppicing by producing many small stems which are harvested every 3 years. These crops are not grown for food - they are grown strictly for the grass and woody biomass. An advantage of these crops is that they can grow on relatively poor land (i.e. Class 3 land and lower) with little water, fertilizer and pesticide inputs. Although establishment costs can be high, the grass species only need to be established once every 10-15 years and the tree species every 20-30 years. As perennials, these crops also build soil carbon and health and are much superior to first-generation crops in terms of decreasing greenhouse gas emissions.

So where does the “chicken and egg” problem come in? As noted above, building a biorefinery to process biomass crops into biofuels and other bioproducts is very expensive. Before making such a large investment, the biorefinery developer wants a guaranteed, long-term supply of biomass feedstock. From an agricultural producer perspective, committing land, effort, and establishment costs for these biomass crops does not make sense unless they know they have someone to buy the biomass. Hence the chicken and egg problem – which comes first: (1) farmers produce biomass crops and hope that they will have a market to sell the biomass, or (2) a biorefiner builds a very expensive processing plant and hopes that an area can produce the volume of biomass that is needed.

Stay tuned for a second article by Professor Vessey where he proposes a solution to this “chicken and egg” biomass crops problem.



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