Glossary for the N Rate Calculator Program

The following glossary explains some of the terms used in the N rate calculator spreadsheet.

Average yield:
Equals the average yield achieved in the studies used to develop the yield response functions.

Crop:N Price Ratio:
The crop price per bushel divided by the cost of N ($/lb). This ratio represents the lb of N that can be purchased with one bu of crop. Crop price and fertilizer cost may change but the most economic rate of N (MERN) remains constant as long as the Crop:N Price ratio is unchanged. As the Price ratio increases, so does the N rate.

Current N Rate (lb N/ac):
The rate guideline received from the soil test lab (which may or may not be based on economics) or the common practice of the grower. This is modified by the user.

Fertilizer as variable chart:
This option illustrates the net return table with changing fertilizer costs along the top of the table. This best illustrates the impact of changing fertilizer prices on the Maximum Economic Rate of N.

Fertilizer costs:
In this calculator only the variable cost of N fertilizer is considered. Application costs depend upon N source, placement and timing and may vary from $4-8/ac. Custom soil sampling and analysis costs between $0.40 to $0.80/ac.

Fertilizer Type and %N:
The N source is entered by the user, stating the fertilizer type and the %N.

Marginal Cost:
Equals the cost of the incremental increase in N fertilizer rate (based on the fertilizer N rate increment)

Marginal Return:
Equals the marginal yield increase x price

Marginal Revenue:
Equals marginal return divided by marginal cost to produce the return on the last dollar spent on N.
In order to reduce the financial risk of fertilizing with high rates of N and not achieving these returns, one can demand a greater return on the last dollar spent on nitrogen. This is determined by the marginal return: marginal cost. Maximum economic N rate occurs when the last increment (or dollar) spent on N returns a dollar value of

crop. To increase risk averseness you may choose to demand $1.25 or $1.50 return for that last $1 spent on nitrogen.

Reasons why one might wish to exercise increasing levels of risk management:

1. high levels of production risk making it unlikely to achieve such yield increases illustrated in the calculator
   - variable fields
   - poor drainage, risk of severe drought
   - risk of early frosts
   - unable to provide optimum pest management
   - delayed seeding
2. economic risks
   - high interest rates and high input carrying charges
   - highly leveraged

Marginal Yield:

Equals the bu/ac increase in yield achieved from the incremental increase in N fertilizer rate (Fertilizer N rate increment is set by user in Data Entry)

Moisture supply categories: Moist, Dry and Arid

Yield potential and N requirements vary across Manitoba based on available moisture supply. Where moisture supply is greater the yield potential is also higher. In 1982 the Manitoba Provincial Soil Testing Laboratory started offering N recommendations based on the moisture supply. Soils in the province were segregated in zones of recognized moisture supply as follows in Table 1. The newer N response studies were allocated into similar categories to reflect the moisture availability and potential yields.

Table 1. Available moisture supply by location and soil characteristics in Manitoba*.

Moisture supply	Location	Texture/drainage
Moist	any	Peat soils
	MB lowlands (E of the escarpment) and Swan River valley	Any texture- poorly drained
	Manitoba Uplands	Heavy textured Dark-grey/grey wooded soils
Dry	MB lowlands and Swan River valley	Light textured, moderately drained
	Manitoba Uplands	Light textured Dark-grey/grey wooded soils
		Any texture – moderately to poorly drained
Arid	MB lowlands and Swan River valley	Light textured – well drained
	Manitoba Uplands	Light textured – well drained

(* from Climate modified fertilizer recommendations for wheat, barley and oats. 1982. Manitoba Agronomists' Proceedings. Pp137-144)

Net return:

The net return to N fertilizer from the yield increase achieved with that N fertilizer rate above the unfertilized yield.
Equals (crop price x yield increase) – (N price x N rate)

Open pollinated (OP) and hybrid canola:
Hybrid canola typically produces higher yield at similar N rates as OP canola, and continues to increase yield after OP canola has attained maximum yield. The data set for canola is predominantly from soils rated in the Moist Moisture supply category.

Soil test N (0-24"):
Soil test nitrate-N in the 0-24" sampling depth

Total net return:
The net return of the entire crop yield produced. This is the entire return to pay for all other input expenses, fixed costs and profit.
Equals (crop price x yield) – (N price x N rate)

Yield increase from 0 lb N:
Equals the cumulative yield increase with applied N fertilizer above the yield achieved from soil test N only (as inputted by user)