Data is courtesy of AG Analytics

1. Fid
2. Field\_1
3. GridId
   1. ID from QGIS of the 20 different grids
   2. 16 train and 4 test, randomly selected. If do that, drop gridid as input.
4. X
   1. data point’s longitude coordinate using the WGS-84 coordinate reference system (CRS) with precision of 1.11 x 10-6 m ( 4 cm).
5. Y
   1. data point’s latitude coordinate using the WGS-84 coordinate reference system (CRS) with precision of 1.11 x 10-6 m ( 4 cm).
6. **VRYieldVOI**
   1. used to store volumetric yield.
   2. units are user-defined and are usually either kg/ha, lbs/ac, or bushels/ac.
7. Row & Column
   1. row and column of the data point’s location within Ag Analytic’s 10ft x 10ft data point sample grid for a given field.
   2. Row and col identifiers are 0-indexed (i.e. column numbering starts with 0 instead of 1).
   3. Values are calculated from raw data using proprietary algorithms.
   4. Data are of the integer data type and should be treated as being categorical in most cases.
8. Relative\_Elevation1
   1. decimal value representing the standardized elevation value (z-score) of a given record relative to the mean elevation of the field.
   2. Relative elevation can affect water and nutrient status of a given area due to how water and nutrients flow to and from a given area due to elevation differences.
   3. positive or negative numeric with 9 decimals of precision
9. Slope1
   1. holds the maximum slope value present in the 10m x 10m cell represented by a given data point.
   2. Slope can affect water and nutrient status of a given point due to how water and nutrients flow over that area due to the degree of slope.
10. TRI1
    1. terrain ruggedness index value
    2. amount of hilliness and slope amount present within a given cell
    3. Terrain ruggedness can affect water and nutrients flow
11. TPI1
    1. Topographic position index
    2. Difference of target cell to the average cells around it.
12. Elevation1
    1. absolute elevation value of a given point
    2. generally, meters above sea level (ASL)
13. Application\_4\_N\_rate X
14. Application\_5\_N\_rate X
15. Application\_7\_N\_rate
16. Application\_10\_N\_rate

Application\_<#>\_<N\_Rate:

* these fields hold the application rates of nitrogen (N) applications for each record
* # is the growth stage
* There are 10 fields for each of these for a total of 30 total fields.
* Nitrogen application rate, in conjunction with the percentage of N applied is very strongly correlated to plant growth and yield in most grain crops
* Units are user-defined and are generally gallons/ac, lbs/ac, or kg/ha.

1. ph\_mean\_30\_60
   1. mean soil pH value present between 30cm and 60 cm for a given 10m x 10m cell
   2. pH is the -log of hydrogen ion activity present in a sample.
   3. Values below 7 are acidic and values above 7 are alkaline.
   4. Soil pH is generally between 4 and 10, except in extreme cases. Soil pH affects nutrient availability to plants. Optimum ranges are between 5.5 and 6.5 for most agronomic crops.
2. clay\_mean\_30\_60
3. silt\_mean\_30\_60
4. sand\_mean\_30\_60

Clay\_mean\_30, 60, silt\_mean\_30\_60, and sand\_mean\_30\_60

* denote the percentages of clay, silt, and sand, respectively, present in the soil between 30cm and 60cm for a given 10m x 10m cell record.
* The relative percentages of each affect the soil’s texture, nutrient holding capacity, and other chemical and physical soil properties.

1. ksat\_mean\_30\_60
   1. mean saturated hydraulic conductivity of soil between 30cm and 60cm for a given 10m x 10m cell record.
   2. This value indicates how easily water can percolate through soil once the soil is fully saturated. Higher values indicate greater flow rates, meaning that the soil allows water to flow through it more freely than areas of soil having lower ksat values.
   3. Soil’s hydraulic conductivity can influence water and nutrient availability to plants by influencing how long water and nutrients are present in a given area and how quickly mobile nutrients can leach away.
   4. Soils having higher percentages of clay generally have lower ksat values where soils having higher percentages of sand generally have higher ksat values.
2. om\_mean\_30\_60
   1. mean organic matter (OM) percentage of the soil for a given 10m x 10m cell record between 30cm and 60cm.
   2. OM generally improves soil texture and soil nutrient and water holding capacity, and nutrient availability to plants.

Questions:

1. What does it mean by between 30cm and 60cm? below ground where the roots are. Using a magnet
2. Can I get rid of the first 3 columns which I assume are identifiers? First 2.
3. Confused about the nitrogen application variables.
4. Variable description for TPI1 is missing