

## Oilseed Yield Advisory Ranges for RAG

This document provides data-driven ranges of feature values associated with low, medium, and high yield for each oilseed crop present in the dataset.

Ranges are computed from the synthetic training dataset by grouping observations of each crop into three yield bands (low, medium, high) based on quantiles of yield\_t\_ha, and then recording the minimum and maximum value of each feature within each band.

For each crop and feature:

- Low yield band corresponds to the lowest ~33% of yield observations.
- Medium yield band corresponds to the middle ~33% of yield observations.
- High yield band corresponds to the highest ~33% of yield observations.

These ranges are intended to be used by a Retrieval-Augmented Generation (RAG) system to support advisory text generation conditioned on user-provided feature values.

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Crop: SUNFLOWER  
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Preferred categories by yield band (categorical features):

Feature: variety\_group

Low yield: early (38.7% of records), mid (33.3% of records), late (28.0% of records)

Medium yield: mid (34.4% of records), early (33.3% of records), late (32.3% of records)

High yield: late (41.3% of records), mid (33.1% of records), early (25.6% of records)

Feature: soil\_texture

Low yield: sandy (33.9% of records), clay (33.4% of records), loam (32.7% of records)

Medium yield: sandy (34.3% of records), clay (32.9% of records), loam (32.8% of records)

High yield: loam (34.0% of records), sandy (33.7% of records), clay (32.3% of records)

Numeric feature ranges by yield band:

Feature: maturity\_days

Low yield: 95.00 – 129.00

Medium yield: 95.00 – 129.00

High yield: 95.00 – 129.00

Feature: base\_yield\_potential\_t\_ha

Low yield: 2.38 – 4.20

Medium yield: 2.38 – 4.20

High yield: 2.39 – 4.20

Feature: mean\_temp\_gs\_C

Low yield: 12.00 – 31.99

Medium yield: 12.01 – 32.00

High yield: 12.01 – 32.00

Feature: temp\_flowering\_C

Low yield: 10.00 – 35.00

Medium yield: 10.00 – 34.99

High yield: 10.00 – 35.00

Feature: seasonal\_rain\_mm

Low yield: 250.00 – 949.70

Medium yield: 250.20 – 950.00

High yield: 250.30 – 949.70

Feature: rain\_flowering\_mm

Low yield: 0.00 – 250.00  
Medium yield: 0.10 – 250.00  
High yield: 0.10 – 250.00

Feature: humidity\_mean\_pct  
Low yield: 35.00 – 90.00  
Medium yield: 35.00 – 90.00  
High yield: 35.00 – 90.00

Feature: solar\_MJ\_m2\_day  
Low yield: 12.00 – 24.99  
Medium yield: 12.00 – 25.00  
High yield: 12.00 – 25.00

Feature: soil\_pH  
Low yield: 4.50 – 8.50  
Medium yield: 4.50 – 8.50  
High yield: 4.50 – 8.50

Feature: soil\_oc\_pct  
Low yield: 0.20 – 1.80  
Medium yield: 0.20 – 1.80  
High yield: 0.20 – 1.80

Feature: clay\_pct  
Low yield: 5.00 – 60.00  
Medium yield: 5.00 – 60.00  
High yield: 5.00 – 60.00

Feature: soil\_depth\_cm  
Low yield: 40.00 – 150.00  
Medium yield: 40.00 – 150.00  
High yield: 40.00 – 150.00

Feature: soil\_N\_status\_kg\_ha  
Low yield: 80.00 – 219.90  
Medium yield: 80.00 – 220.00  
High yield: 80.00 – 220.00

Feature: soil\_P\_status\_kg\_ha  
Low yield: 5.00 – 40.00  
Medium yield: 5.00 – 40.00  
High yield: 5.00 – 40.00

Feature: soil\_K\_status\_kg\_ha  
Low yield: 80.00 – 399.90  
Medium yield: 80.10 – 399.90  
High yield: 80.00 – 400.00

Feature: fert\_N\_kg\_ha  
Low yield: 40.20 – 260.00  
Medium yield: 40.00 – 259.90  
High yield: 40.00 – 259.90

Feature: fert\_P\_kg\_ha  
Low yield: 10.00 – 80.00  
Medium yield: 10.00 – 80.00  
High yield: 10.00 – 80.00

Feature: fert\_K\_kg\_ha  
Low yield: 0.00 – 120.00  
Medium yield: 0.00 – 120.00

High yield: 0.00 – 120.00

Feature: sowing\_doy

Low yield: 60.00 – 259.00

Medium yield: 60.00 – 259.00

High yield: 60.00 – 259.00

Feature: plant\_density\_plants\_m2

Low yield: 40.02 – 79.99

Medium yield: 40.01 – 79.99

High yield: 40.00 – 79.97

Feature: irrigation\_events

Low yield: 0.00 – 5.00

Medium yield: 0.00 – 5.00

High yield: 0.00 – 5.00

Feature: herbicide\_apps

Low yield: 0.00 – 2.00

Medium yield: 0.00 – 2.00

High yield: 0.00 – 2.00

Feature: insecticide\_apps

Low yield: 0.00 – 3.00

Medium yield: 0.00 – 3.00

High yield: 0.00 – 3.00

Feature: fungicide\_apps

Low yield: 0.00 – 2.00

Medium yield: 0.00 – 2.00

High yield: 0.00 – 2.00

Feature: weed\_pressure\_index

Low yield: 0.00 – 0.90

Medium yield: 0.00 – 0.85

High yield: 0.00 – 0.81

Feature: pest\_pressure\_index

Low yield: 0.01 – 0.97

Medium yield: 0.01 – 0.95

High yield: 0.01 – 0.92

Feature: disease\_pressure\_index

Low yield: 0.01 – 0.94

Medium yield: 0.01 – 0.93

High yield: 0.01 – 0.92

Feature: ndvi\_early

Low yield: 0.20 – 0.80

Medium yield: 0.20 – 0.80

High yield: 0.20 – 0.80

Feature: ndvi\_flowering

Low yield: 0.30 – 0.90

Medium yield: 0.30 – 0.90

High yield: 0.30 – 0.90

Feature: ndvi\_peak

Low yield: 0.40 – 0.90

Medium yield: 0.41 – 0.90

High yield: 0.41 – 0.90

Feature: ndvi\_late  
Low yield: 0.20 – 0.85  
Medium yield: 0.20 – 0.85  
High yield: 0.21 – 0.85

Feature: ndvi\_veg\_slope  
Low yield: 0.00 – 0.03  
Medium yield: 0.00 – 0.03  
High yield: 0.00 – 0.03

Feature: seed\_moisture\_pct  
Low yield: 7.00 – 20.00  
Medium yield: 7.00 – 20.00  
High yield: 7.00 – 20.00

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Crop: MUSTARD  
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Preferred categories by yield band (categorical features):

Feature: variety\_group  
Low yield: early (35.5% of records), mid (33.0% of records), late (31.5% of records)  
Medium yield: late (34.2% of records), mid (33.7% of records), early (32.0% of records)  
High yield: late (39.0% of records), mid (32.7% of records), early (28.3% of records)

Feature: soil\_texture  
Low yield: clay (33.8% of records), sandy (33.7% of records), loam (32.5% of records)  
Medium yield: loam (34.2% of records), sandy (33.0% of records), clay (32.8% of records)  
High yield: clay (34.0% of records), loam (33.4% of records), sandy (32.6% of records)

Numeric feature ranges by yield band:

Feature: maturity\_days  
Low yield: 100.00 – 139.00  
Medium yield: 100.00 – 139.00  
High yield: 100.00 – 139.00

Feature: base\_yield\_potential\_t\_ha  
Low yield: 1.43 – 3.15  
Medium yield: 1.43 – 3.15  
High yield: 1.44 – 3.15

Feature: mean\_temp\_gs\_C  
Low yield: 12.00 – 32.00  
Medium yield: 12.06 – 31.96  
High yield: 12.00 – 32.00

Feature: temp\_flowering\_C  
Low yield: 10.00 – 35.00  
Medium yield: 10.01 – 34.95  
High yield: 10.00 – 34.97

Feature: seasonal\_rain\_mm  
Low yield: 250.10 – 950.00  
Medium yield: 250.20 – 949.40  
High yield: 250.20 – 950.00

Feature: rain\_flowering\_mm  
Low yield: 0.00 – 250.00  
Medium yield: 0.10 – 249.90

High yield: 0.00 – 250.00

Feature: humidity\_mean\_pct  
Low yield: 35.00 – 90.00  
Medium yield: 35.00 – 90.00  
High yield: 35.00 – 90.00

Feature: solar\_MJ\_m2\_day  
Low yield: 12.00 – 25.00  
Medium yield: 12.01 – 24.95  
High yield: 12.00 – 25.00

Feature: soil\_pH  
Low yield: 4.50 – 8.50  
Medium yield: 4.50 – 8.50  
High yield: 4.50 – 8.50

Feature: soil\_oc\_pct  
Low yield: 0.20 – 1.80  
Medium yield: 0.20 – 1.80  
High yield: 0.20 – 1.80

Feature: clay\_pct  
Low yield: 5.00 – 60.00  
Medium yield: 5.00 – 60.00  
High yield: 5.00 – 60.00

Feature: soil\_depth\_cm  
Low yield: 40.00 – 150.00  
Medium yield: 40.00 – 149.90  
High yield: 40.00 – 150.00

Feature: soil\_N\_status\_kg\_ha  
Low yield: 80.00 – 220.00  
Medium yield: 80.00 – 219.90  
High yield: 80.00 – 219.90

Feature: soil\_P\_status\_kg\_ha  
Low yield: 5.00 – 40.00  
Medium yield: 5.00 – 39.90  
High yield: 5.00 – 40.00

Feature: soil\_K\_status\_kg\_ha  
Low yield: 80.00 – 400.00  
Medium yield: 80.30 – 399.70  
High yield: 80.00 – 399.90

Feature: fert\_N\_kg\_ha  
Low yield: 40.00 – 259.90  
Medium yield: 40.20 – 259.80  
High yield: 40.10 – 260.00

Feature: fert\_P\_kg\_ha  
Low yield: 10.00 – 80.00  
Medium yield: 10.00 – 79.90  
High yield: 10.00 – 80.00

Feature: fert\_K\_kg\_ha  
Low yield: 0.10 – 120.00  
Medium yield: 0.10 – 119.90  
High yield: 0.00 – 119.90

Feature: sowing\_doy  
Low yield: 60.00 – 259.00  
Medium yield: 60.00 – 259.00  
High yield: 60.00 – 259.00

Feature: plant\_density\_plants\_m2  
Low yield: 80.02 – 200.00  
Medium yield: 80.04 – 199.95  
High yield: 80.02 – 200.00

Feature: irrigation\_events  
Low yield: 0.00 – 5.00  
Medium yield: 0.00 – 5.00  
High yield: 0.00 – 5.00

Feature: herbicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: insecticide\_apps  
Low yield: 0.00 – 3.00  
Medium yield: 0.00 – 3.00  
High yield: 0.00 – 3.00

Feature: fungicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: weed\_pressure\_index  
Low yield: 0.00 – 0.91  
Medium yield: 0.01 – 0.81  
High yield: 0.00 – 0.83

Feature: pest\_pressure\_index  
Low yield: 0.01 – 0.96  
Medium yield: 0.02 – 0.90  
High yield: 0.01 – 0.92

Feature: disease\_pressure\_index  
Low yield: 0.01 – 0.95  
Medium yield: 0.02 – 0.91  
High yield: 0.01 – 0.88

Feature: ndvi\_early  
Low yield: 0.20 – 0.80  
Medium yield: 0.20 – 0.80  
High yield: 0.20 – 0.80

Feature: ndvi\_flowering  
Low yield: 0.30 – 0.90  
Medium yield: 0.30 – 0.90  
High yield: 0.30 – 0.90

Feature: ndvi\_peak  
Low yield: 0.40 – 0.90  
Medium yield: 0.44 – 0.90  
High yield: 0.43 – 0.90

Feature: ndvi\_late  
Low yield: 0.20 – 0.85

Medium yield: 0.20 – 0.85  
High yield: 0.20 – 0.85

Feature: ndvi\_veg\_slope  
Low yield: 0.00 – 0.03  
Medium yield: 0.00 – 0.03  
High yield: 0.00 – 0.03

Feature: seed\_moisture\_pct  
Low yield: 7.00 – 20.00  
Medium yield: 7.00 – 20.00  
High yield: 7.00 – 20.00

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Crop: SOYBEAN

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Preferred categories by yield band (categorical features):

Feature: variety\_group  
Low yield: early (38.8% of records), mid (32.8% of records), late (28.4% of records)  
Medium yield: early (34.2% of records), late (34.1% of records), mid (31.8% of records)  
High yield: late (38.7% of records), mid (33.1% of records), early (28.2% of records)

Feature: soil\_texture  
Low yield: loam (33.6% of records), sandy (33.5% of records), clay (32.8% of records)  
Medium yield: sandy (33.4% of records), loam (33.4% of records), clay (33.1% of records)  
High yield: loam (33.5% of records), clay (33.3% of records), sandy (33.2% of records)

Numeric feature ranges by yield band:

Feature: maturity\_days  
Low yield: 95.00 – 124.00  
Medium yield: 95.00 – 124.00  
High yield: 95.00 – 124.00

Feature: base\_yield\_potential\_t\_ha  
Low yield: 1.90 – 3.67  
Medium yield: 1.90 – 3.67  
High yield: 1.90 – 3.67

Feature: mean\_temp\_gs\_C  
Low yield: 12.00 – 32.00  
Medium yield: 12.01 – 32.00  
High yield: 12.00 – 31.99

Feature: temp\_flowering\_C  
Low yield: 10.01 – 34.99  
Medium yield: 10.00 – 34.99  
High yield: 10.03 – 34.99

Feature: seasonal\_rain\_mm  
Low yield: 250.00 – 949.70  
Medium yield: 250.10 – 949.90  
High yield: 250.10 – 949.90

Feature: rain\_flowering\_mm  
Low yield: 0.00 – 249.90  
Medium yield: 0.10 – 249.80  
High yield: 0.00 – 249.90

Feature: humidity\_mean\_pct  
Low yield: 35.00 – 90.00  
Medium yield: 35.00 – 90.00  
High yield: 35.00 – 90.00

Feature: solar\_MJ\_m2\_day  
Low yield: 12.01 – 25.00  
Medium yield: 12.01 – 25.00  
High yield: 12.00 – 25.00

Feature: soil\_pH  
Low yield: 4.50 – 8.50  
Medium yield: 4.50 – 8.50  
High yield: 4.50 – 8.50

Feature: soil\_oc\_pct  
Low yield: 0.20 – 1.80  
Medium yield: 0.20 – 1.80  
High yield: 0.20 – 1.80

Feature: clay\_pct  
Low yield: 5.00 – 60.00  
Medium yield: 5.00 – 60.00  
High yield: 5.00 – 60.00

Feature: soil\_depth\_cm  
Low yield: 40.00 – 150.00  
Medium yield: 40.00 – 150.00  
High yield: 40.00 – 150.00

Feature: soil\_N\_status\_kg\_ha  
Low yield: 80.00 – 220.00  
Medium yield: 80.00 – 220.00  
High yield: 80.00 – 220.00

Feature: soil\_P\_status\_kg\_ha  
Low yield: 5.00 – 40.00  
Medium yield: 5.00 – 40.00  
High yield: 5.00 – 40.00

Feature: soil\_K\_status\_kg\_ha  
Low yield: 80.10 – 400.00  
Medium yield: 80.10 – 400.00  
High yield: 80.00 – 400.00

Feature: fert\_N\_kg\_ha  
Low yield: 40.10 – 260.00  
Medium yield: 40.10 – 260.00  
High yield: 40.00 – 260.00

Feature: fert\_P\_kg\_ha  
Low yield: 10.00 – 80.00  
Medium yield: 10.00 – 79.90  
High yield: 10.00 – 80.00

Feature: fert\_K\_kg\_ha  
Low yield: 0.00 – 120.00  
Medium yield: 0.00 – 120.00  
High yield: 0.10 – 119.90

Feature: sowing\_doy  
Low yield: 60.00 – 259.00

Medium yield: 60.00 – 259.00  
High yield: 60.00 – 259.00

Feature: plant\_density\_plants\_m2  
Low yield: 30.00 – 60.00  
Medium yield: 30.03 – 60.00  
High yield: 30.00 – 60.00

Feature: irrigation\_events  
Low yield: 0.00 – 5.00  
Medium yield: 0.00 – 5.00  
High yield: 0.00 – 5.00

Feature: herbicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: insecticide\_apps  
Low yield: 0.00 – 3.00  
Medium yield: 0.00 – 3.00  
High yield: 0.00 – 3.00

Feature: fungicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: weed\_pressure\_index  
Low yield: 0.00 – 0.86  
Medium yield: 0.01 – 0.89  
High yield: 0.00 – 0.87

Feature: pest\_pressure\_index  
Low yield: 0.01 – 0.93  
Medium yield: 0.01 – 0.92  
High yield: 0.01 – 0.91

Feature: disease\_pressure\_index  
Low yield: 0.00 – 0.94  
Medium yield: 0.01 – 0.94  
High yield: 0.01 – 0.94

Feature: ndvi\_early  
Low yield: 0.20 – 0.80  
Medium yield: 0.20 – 0.80  
High yield: 0.20 – 0.80

Feature: ndvi\_flowering  
Low yield: 0.30 – 0.90  
Medium yield: 0.30 – 0.90  
High yield: 0.30 – 0.90

Feature: ndvi\_peak  
Low yield: 0.40 – 0.90  
Medium yield: 0.40 – 0.90  
High yield: 0.42 – 0.90

Feature: ndvi\_late  
Low yield: 0.20 – 0.85  
Medium yield: 0.20 – 0.85  
High yield: 0.20 – 0.85

Feature: ndvi\_veg\_slope  
Low yield: 0.00 – 0.03  
Medium yield: 0.00 – 0.03  
High yield: 0.00 – 0.03

Feature: seed\_moisture\_pct  
Low yield: 7.00 – 20.00  
Medium yield: 7.00 – 20.00  
High yield: 7.00 – 20.00

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Crop: SAFFLOWER

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Preferred categories by yield band (categorical features):

Feature: variety\_group  
Low yield: early (42.7% of records), mid (31.6% of records), late (25.7% of records)  
Medium yield: late (36.3% of records), early (33.7% of records), mid (30.0% of records)  
High yield: late (44.0% of records), mid (29.5% of records), early (26.5% of records)

Feature: soil\_texture  
Low yield: sandy (34.4% of records), loam (34.1% of records), clay (31.5% of records)  
Medium yield: sandy (34.3% of records), clay (34.1% of records), loam (31.6% of records)  
High yield: loam (33.9% of records), sandy (33.8% of records), clay (32.3% of records)

Numeric feature ranges by yield band:

Feature: maturity\_days  
Low yield: 110.00 – 149.00  
Medium yield: 110.00 – 149.00  
High yield: 110.00 – 149.00

Feature: base\_yield\_potential\_t\_ha  
Low yield: 2.85 – 5.22  
Medium yield: 2.85 – 5.23  
High yield: 2.95 – 5.25

Feature: mean\_temp\_gs\_C  
Low yield: 12.03 – 31.98  
Medium yield: 12.04 – 31.96  
High yield: 12.06 – 31.94

Feature: temp\_flowering\_C  
Low yield: 10.05 – 34.98  
Medium yield: 10.00 – 34.81  
High yield: 10.00 – 34.96

Feature: seasonal\_rain\_mm  
Low yield: 251.20 – 949.80  
Medium yield: 250.20 – 948.50  
High yield: 250.20 – 949.20

Feature: rain\_flowering\_mm  
Low yield: 0.00 – 250.00  
Medium yield: 0.30 – 249.80  
High yield: 0.40 – 249.30

Feature: humidity\_mean\_pct  
Low yield: 35.40 – 89.90  
Medium yield: 35.20 – 90.00

High yield: 35.00 – 90.00

Feature: solar\_MJ\_m2\_day

Low yield: 12.02 – 24.98

Medium yield: 12.02 – 24.98

High yield: 12.01 – 24.99

Feature: soil\_pH

Low yield: 4.50 – 8.49

Medium yield: 4.50 – 8.50

High yield: 4.51 – 8.49

Feature: soil\_oc\_pct

Low yield: 0.20 – 1.80

Medium yield: 0.20 – 1.80

High yield: 0.20 – 1.80

Feature: clay\_pct

Low yield: 5.00 – 59.70

Medium yield: 5.00 – 60.00

High yield: 5.00 – 60.00

Feature: soil\_depth\_cm

Low yield: 40.20 – 149.10

Medium yield: 40.00 – 149.90

High yield: 40.00 – 149.90

Feature: soil\_N\_status\_kg\_ha

Low yield: 80.00 – 219.90

Medium yield: 80.20 – 219.90

High yield: 80.00 – 219.80

Feature: soil\_P\_status\_kg\_ha

Low yield: 5.10 – 39.90

Medium yield: 5.00 – 40.00

High yield: 5.00 – 40.00

Feature: soil\_K\_status\_kg\_ha

Low yield: 80.00 – 399.90

Medium yield: 81.00 – 399.90

High yield: 80.10 – 399.80

Feature: fert\_N\_kg\_ha

Low yield: 40.40 – 260.00

Medium yield: 40.10 – 259.90

High yield: 40.20 – 258.90

Feature: fert\_P\_kg\_ha

Low yield: 10.10 – 79.90

Medium yield: 10.10 – 80.00

High yield: 10.00 – 79.90

Feature: fert\_K\_kg\_ha

Low yield: 0.00 – 120.00

Medium yield: 0.00 – 120.00

High yield: 0.50 – 119.90

Feature: sowing\_doy

Low yield: 60.00 – 259.00

Medium yield: 60.00 – 259.00

High yield: 60.00 – 259.00

Feature: plant\_density\_plants\_m2

Low yield: 70.01 – 159.98

Medium yield: 70.08 – 159.75

High yield: 70.35 – 159.79

Feature: irrigation\_events

Low yield: 0.00 – 5.00

Medium yield: 0.00 – 5.00

High yield: 0.00 – 5.00

Feature: herbicide\_apps

Low yield: 0.00 – 2.00

Medium yield: 0.00 – 2.00

High yield: 0.00 – 2.00

Feature: insecticide\_apps

Low yield: 0.00 – 3.00

Medium yield: 0.00 – 3.00

High yield: 0.00 – 3.00

Feature: fungicide\_apps

Low yield: 0.00 – 2.00

Medium yield: 0.00 – 2.00

High yield: 0.00 – 2.00

Feature: weed\_pressure\_index

Low yield: 0.01 – 0.89

Medium yield: 0.02 – 0.79

High yield: 0.01 – 0.83

Feature: pest\_pressure\_index

Low yield: 0.02 – 0.91

Medium yield: 0.02 – 0.87

High yield: 0.01 – 0.86

Feature: disease\_pressure\_index

Low yield: 0.03 – 0.90

Medium yield: 0.04 – 0.88

High yield: 0.01 – 0.94

Feature: ndvi\_early

Low yield: 0.20 – 0.80

Medium yield: 0.20 – 0.80

High yield: 0.20 – 0.80

Feature: ndvi\_flowering

Low yield: 0.30 – 0.90

Medium yield: 0.30 – 0.90

High yield: 0.30 – 0.90

Feature: ndvi\_peak

Low yield: 0.40 – 0.90

Medium yield: 0.41 – 0.90

High yield: 0.40 – 0.90

Feature: ndvi\_late

Low yield: 0.20 – 0.85

Medium yield: 0.20 – 0.84

High yield: 0.20 – 0.84

Feature: ndvi\_veg\_slope

Low yield: 0.00 – 0.03

Medium yield: 0.00 – 0.03  
High yield: 0.00 – 0.03

Feature: seed\_moisture\_pct  
Low yield: 7.00 – 20.00  
Medium yield: 7.00 – 20.00  
High yield: 7.00 – 20.00

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Crop: NIGER SEED

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Preferred categories by yield band (categorical features):

Feature: variety\_group  
Low yield: early (41.9% of records), mid (32.7% of records), late (25.3% of records)  
Medium yield: early (33.7% of records), mid (33.7% of records), late (32.6% of records)  
High yield: late (43.2% of records), mid (32.8% of records), early (24.0% of records)

Feature: soil\_texture  
Low yield: loam (34.4% of records), sandy (33.2% of records), clay (32.4% of records)  
Medium yield: loam (34.8% of records), clay (33.6% of records), sandy (31.6% of records)  
High yield: loam (34.6% of records), clay (32.9% of records), sandy (32.5% of records)

Numeric feature ranges by yield band:

Feature: maturity\_days  
Low yield: 110.00 – 149.00  
Medium yield: 110.00 – 149.00  
High yield: 110.00 – 149.00

Feature: base\_yield\_potential\_t\_ha  
Low yield: 2.85 – 5.17  
Medium yield: 2.85 – 5.24  
High yield: 2.96 – 5.25

Feature: mean\_temp\_gs\_C  
Low yield: 12.03 – 31.98  
Medium yield: 12.03 – 31.99  
High yield: 12.01 – 31.98

Feature: temp\_flowering\_C  
Low yield: 10.02 – 34.92  
Medium yield: 10.11 – 34.98  
High yield: 10.02 – 34.99

Feature: seasonal\_rain\_mm  
Low yield: 250.20 – 949.70  
Medium yield: 250.50 – 950.00  
High yield: 250.10 – 949.60

Feature: rain\_flowering\_mm  
Low yield: 0.50 – 249.40  
Medium yield: 0.10 – 249.90  
High yield: 0.60 – 249.50

Feature: humidity\_mean\_pct  
Low yield: 35.00 – 90.00  
Medium yield: 35.00 – 90.00  
High yield: 35.00 – 89.90

Feature: solar\_MJ\_m2\_day  
Low yield: 12.00 – 25.00  
Medium yield: 12.01 – 24.99  
High yield: 12.01 – 24.98

Feature: soil\_pH  
Low yield: 4.51 – 8.50  
Medium yield: 4.50 – 8.50  
High yield: 4.50 – 8.49

Feature: soil\_oc\_pct  
Low yield: 0.20 – 1.80  
Medium yield: 0.20 – 1.80  
High yield: 0.20 – 1.80

Feature: clay\_pct  
Low yield: 5.00 – 60.00  
Medium yield: 5.10 – 60.00  
High yield: 5.20 – 59.90

Feature: soil\_depth\_cm  
Low yield: 40.00 – 149.80  
Medium yield: 40.10 – 149.80  
High yield: 40.20 – 149.90

Feature: soil\_N\_status\_kg\_ha  
Low yield: 80.30 – 219.90  
Medium yield: 80.20 – 220.00  
High yield: 80.50 – 219.90

Feature: soil\_P\_status\_kg\_ha  
Low yield: 5.00 – 40.00  
Medium yield: 5.00 – 40.00  
High yield: 5.00 – 40.00

Feature: soil\_K\_status\_kg\_ha  
Low yield: 80.10 – 400.00  
Medium yield: 80.50 – 400.00  
High yield: 80.30 – 400.00

Feature: fert\_N\_kg\_ha  
Low yield: 40.10 – 259.80  
Medium yield: 40.20 – 259.60  
High yield: 40.30 – 259.30

Feature: fert\_P\_kg\_ha  
Low yield: 10.10 – 79.80  
Medium yield: 10.00 – 79.90  
High yield: 10.10 – 80.00

Feature: fert\_K\_kg\_ha  
Low yield: 0.00 – 119.70  
Medium yield: 0.10 – 119.90  
High yield: 0.10 – 120.00

Feature: sowing\_doy  
Low yield: 60.00 – 259.00  
Medium yield: 60.00 – 259.00  
High yield: 60.00 – 259.00

Feature: plant\_density\_plants\_m2  
Low yield: 70.04 – 159.75

Medium yield: 70.05 – 159.98  
High yield: 70.12 – 159.99

Feature: irrigation\_events  
Low yield: 0.00 – 5.00  
Medium yield: 0.00 – 5.00  
High yield: 0.00 – 5.00

Feature: herbicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: insecticide\_apps  
Low yield: 0.00 – 3.00  
Medium yield: 0.00 – 3.00  
High yield: 0.00 – 3.00

Feature: fungicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: weed\_pressure\_index  
Low yield: 0.01 – 0.89  
Medium yield: 0.01 – 0.87  
High yield: 0.02 – 0.82

Feature: pest\_pressure\_index  
Low yield: 0.00 – 0.92  
Medium yield: 0.04 – 0.88  
High yield: 0.02 – 0.87

Feature: disease\_pressure\_index  
Low yield: 0.01 – 0.92  
Medium yield: 0.01 – 0.88  
High yield: 0.04 – 0.88

Feature: ndvi\_early  
Low yield: 0.20 – 0.80  
Medium yield: 0.20 – 0.80  
High yield: 0.20 – 0.80

Feature: ndvi\_flowering  
Low yield: 0.30 – 0.90  
Medium yield: 0.30 – 0.90  
High yield: 0.30 – 0.90

Feature: ndvi\_peak  
Low yield: 0.40 – 0.90  
Medium yield: 0.42 – 0.90  
High yield: 0.43 – 0.90

Feature: ndvi\_late  
Low yield: 0.20 – 0.82  
Medium yield: 0.20 – 0.85  
High yield: 0.20 – 0.85

Feature: ndvi\_veg\_slope  
Low yield: 0.00 – 0.03  
Medium yield: 0.00 – 0.03  
High yield: 0.00 – 0.03

Feature: seed\_moisture\_pct  
Low yield: 7.00 – 20.00  
Medium yield: 7.00 – 20.00  
High yield: 7.00 – 19.90

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Crop: GROUNDNUT

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Preferred categories by yield band (categorical features):

Feature: variety\_group  
Low yield: early (40.2% of records), mid (33.6% of records), late (26.2% of records)  
Medium yield: early (34.3% of records), mid (33.2% of records), late (32.5% of records)  
High yield: late (42.1% of records), mid (32.6% of records), early (25.3% of records)

Feature: soil\_texture  
Low yield: loam (33.5% of records), sandy (33.5% of records), clay (33.0% of records)  
Medium yield: sandy (33.5% of records), loam (33.3% of records), clay (33.1% of records)  
High yield: clay (33.8% of records), sandy (33.3% of records), loam (32.9% of records)

Numeric feature ranges by yield band:

Feature: maturity\_days  
Low yield: 110.00 – 149.00  
Medium yield: 110.00 – 149.00  
High yield: 110.00 – 149.00

Feature: base\_yield\_potential\_t\_ha  
Low yield: 2.85 – 5.13  
Medium yield: 2.86 – 5.24  
High yield: 2.86 – 5.25

Feature: mean\_temp\_gs\_C  
Low yield: 12.02 – 32.00  
Medium yield: 12.01 – 32.00  
High yield: 12.05 – 31.99

Feature: temp\_flowering\_C  
Low yield: 10.01 – 35.00  
Medium yield: 10.01 – 34.97  
High yield: 10.00 – 34.93

Feature: seasonal\_rain\_mm  
Low yield: 250.60 – 949.70  
Medium yield: 250.30 – 950.00  
High yield: 250.00 – 949.90

Feature: rain\_flowering\_mm  
Low yield: 0.20 – 250.00  
Medium yield: 0.00 – 249.90  
High yield: 0.40 – 249.90

Feature: humidity\_mean\_pct  
Low yield: 35.10 – 90.00  
Medium yield: 35.10 – 90.00  
High yield: 35.00 – 90.00

Feature: solar\_MJ\_m2\_day  
Low yield: 12.00 – 25.00  
Medium yield: 12.00 – 24.99

High yield: 12.01 – 25.00

Feature: soil\_pH

Low yield: 4.50 – 8.50

Medium yield: 4.50 – 8.50

High yield: 4.50 – 8.50

Feature: soil\_oc\_pct

Low yield: 0.20 – 1.80

Medium yield: 0.20 – 1.80

High yield: 0.20 – 1.80

Feature: clay\_pct

Low yield: 5.00 – 60.00

Medium yield: 5.00 – 60.00

High yield: 5.00 – 59.90

Feature: soil\_depth\_cm

Low yield: 40.00 – 150.00

Medium yield: 40.10 – 149.90

High yield: 40.20 – 150.00

Feature: soil\_N\_status\_kg\_ha

Low yield: 80.10 – 220.00

Medium yield: 80.00 – 220.00

High yield: 80.00 – 219.90

Feature: soil\_P\_status\_kg\_ha

Low yield: 5.00 – 40.00

Medium yield: 5.00 – 40.00

High yield: 5.00 – 40.00

Feature: soil\_K\_status\_kg\_ha

Low yield: 80.60 – 399.80

Medium yield: 80.20 – 399.80

High yield: 80.20 – 399.70

Feature: fert\_N\_kg\_ha

Low yield: 40.10 – 259.90

Medium yield: 40.10 – 260.00

High yield: 40.10 – 260.00

Feature: fert\_P\_kg\_ha

Low yield: 10.00 – 80.00

Medium yield: 10.00 – 80.00

High yield: 10.10 – 80.00

Feature: fert\_K\_kg\_ha

Low yield: 0.00 – 120.00

Medium yield: 0.00 – 119.90

High yield: 0.00 – 119.90

Feature: sowing\_doy

Low yield: 60.00 – 259.00

Medium yield: 60.00 – 259.00

High yield: 60.00 – 259.00

Feature: plant\_density\_plants\_m2

Low yield: 70.01 – 159.91

Medium yield: 70.05 – 159.84

High yield: 70.04 – 159.97

Feature: irrigation\_events  
Low yield: 0.00 – 5.00  
Medium yield: 0.00 – 5.00  
High yield: 0.00 – 5.00

Feature: herbicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: insecticide\_apps  
Low yield: 0.00 – 3.00  
Medium yield: 0.00 – 3.00  
High yield: 0.00 – 3.00

Feature: fungicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: weed\_pressure\_index  
Low yield: 0.01 – 0.87  
Medium yield: 0.01 – 0.84  
High yield: 0.00 – 0.82

Feature: pest\_pressure\_index  
Low yield: 0.01 – 0.92  
Medium yield: 0.03 – 0.94  
High yield: 0.00 – 0.89

Feature: disease\_pressure\_index  
Low yield: 0.01 – 0.93  
Medium yield: 0.01 – 0.91  
High yield: 0.02 – 0.91

Feature: ndvi\_early  
Low yield: 0.20 – 0.80  
Medium yield: 0.20 – 0.80  
High yield: 0.20 – 0.80

Feature: ndvi\_flowering  
Low yield: 0.30 – 0.90  
Medium yield: 0.30 – 0.90  
High yield: 0.30 – 0.90

Feature: ndvi\_peak  
Low yield: 0.40 – 0.90  
Medium yield: 0.40 – 0.90  
High yield: 0.40 – 0.90

Feature: ndvi\_late  
Low yield: 0.20 – 0.85  
Medium yield: 0.20 – 0.85  
High yield: 0.20 – 0.85

Feature: ndvi\_veg\_slope  
Low yield: 0.00 – 0.03  
Medium yield: 0.00 – 0.03  
High yield: 0.00 – 0.03

Feature: seed\_moisture\_pct  
Low yield: 7.00 – 20.00

Medium yield: 7.00 – 20.00  
High yield: 7.00 – 20.00

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Crop: CASTOR

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Preferred categories by yield band (categorical features):

Feature: variety\_group

Low yield: early (38.8% of records), mid (35.0% of records), late (26.2% of records)  
Medium yield: early (34.9% of records), mid (33.1% of records), late (31.9% of records)  
High yield: late (40.1% of records), mid (34.2% of records), early (25.7% of records)

Feature: soil\_texture

Low yield: clay (37.6% of records), loam (32.0% of records), sandy (30.4% of records)  
Medium yield: clay (35.2% of records), loam (32.9% of records), sandy (31.9% of records)  
High yield: loam (34.8% of records), clay (33.7% of records), sandy (31.5% of records)

Numeric feature ranges by yield band:

Feature: maturity\_days

Low yield: 110.00 – 149.00  
Medium yield: 110.00 – 149.00  
High yield: 110.00 – 149.00

Feature: base\_yield\_potential\_t\_ha

Low yield: 2.85 – 5.20  
Medium yield: 2.91 – 5.23  
High yield: 2.97 – 5.24

Feature: mean\_temp\_gs\_C

Low yield: 12.03 – 31.98  
Medium yield: 12.01 – 31.93  
High yield: 12.02 – 31.98

Feature: temp\_flowering\_C

Low yield: 10.00 – 34.97  
Medium yield: 10.00 – 34.99  
High yield: 10.01 – 34.93

Feature: seasonal\_rain\_mm

Low yield: 252.10 – 949.50  
Medium yield: 250.90 – 947.70  
High yield: 250.10 – 947.70

Feature: rain\_flowering\_mm

Low yield: 0.40 – 249.80  
Medium yield: 0.20 – 249.90  
High yield: 0.40 – 249.80

Feature: humidity\_mean\_pct

Low yield: 35.40 – 89.90  
Medium yield: 35.10 – 89.90  
High yield: 35.00 – 89.90

Feature: solar\_MJ\_m2\_day

Low yield: 12.06 – 24.97  
Medium yield: 12.04 – 24.91  
High yield: 12.01 – 25.00

Feature: soil\_ph

Low yield: 4.50 – 8.48

Medium yield: 4.53 – 8.50

High yield: 4.51 – 8.50

Feature: soil\_oc\_pct

Low yield: 0.20 – 1.78

Medium yield: 0.20 – 1.79

High yield: 0.20 – 1.80

Feature: clay\_pct

Low yield: 5.10 – 60.00

Medium yield: 5.00 – 59.70

High yield: 5.00 – 60.00

Feature: soil\_depth\_cm

Low yield: 40.40 – 149.70

Medium yield: 40.20 – 149.30

High yield: 40.40 – 150.00

Feature: soil\_N\_status\_kg\_ha

Low yield: 80.30 – 219.80

Medium yield: 80.00 – 220.00

High yield: 80.40 – 219.30

Feature: soil\_P\_status\_kg\_ha

Low yield: 5.10 – 40.00

Medium yield: 5.00 – 40.00

High yield: 5.00 – 39.80

Feature: soil\_K\_status\_kg\_ha

Low yield: 81.40 – 399.70

Medium yield: 80.60 – 399.50

High yield: 80.70 – 400.00

Feature: fert\_N\_kg\_ha

Low yield: 40.80 – 259.90

Medium yield: 41.30 – 259.70

High yield: 40.20 – 259.50

Feature: fert\_P\_kg\_ha

Low yield: 10.20 – 79.90

Medium yield: 10.20 – 80.00

High yield: 10.10 – 80.00

Feature: fert\_K\_kg\_ha

Low yield: 0.00 – 119.60

Medium yield: 0.10 – 119.90

High yield: 0.80 – 119.50

Feature: sowing\_doy

Low yield: 60.00 – 258.00

Medium yield: 60.00 – 259.00

High yield: 60.00 – 259.00

Feature: plant\_density\_plants\_m2

Low yield: 70.26 – 159.99

Medium yield: 70.06 – 160.00

High yield: 70.29 – 159.70

Feature: irrigation\_events

Low yield: 0.00 – 5.00

Medium yield: 0.00 – 5.00  
High yield: 0.00 – 5.00

Feature: herbicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: insecticide\_apps  
Low yield: 0.00 – 3.00  
Medium yield: 0.00 – 3.00  
High yield: 0.00 – 3.00

Feature: fungicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: weed\_pressure\_index  
Low yield: 0.02 – 0.82  
Medium yield: 0.02 – 0.75  
High yield: 0.01 – 0.76

Feature: pest\_pressure\_index  
Low yield: 0.04 – 0.88  
Medium yield: 0.03 – 0.89  
High yield: 0.05 – 0.85

Feature: disease\_pressure\_index  
Low yield: 0.01 – 0.89  
Medium yield: 0.02 – 0.94  
High yield: 0.02 – 0.88

Feature: ndvi\_early  
Low yield: 0.20 – 0.79  
Medium yield: 0.20 – 0.80  
High yield: 0.20 – 0.80

Feature: ndvi\_flowering  
Low yield: 0.30 – 0.90  
Medium yield: 0.30 – 0.90  
High yield: 0.30 – 0.90

Feature: ndvi\_peak  
Low yield: 0.40 – 0.90  
Medium yield: 0.42 – 0.90  
High yield: 0.45 – 0.90

Feature: ndvi\_late  
Low yield: 0.20 – 0.83  
Medium yield: 0.20 – 0.85  
High yield: 0.20 – 0.84

Feature: ndvi\_veg\_slope  
Low yield: 0.00 – 0.03  
Medium yield: 0.00 – 0.03  
High yield: 0.00 – 0.03

Feature: seed\_moisture\_pct  
Low yield: 7.00 – 19.90  
Medium yield: 7.10 – 20.00  
High yield: 7.00 – 19.90

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Crop: SESAME

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Preferred categories by yield band (categorical features):

Feature: variety\_group

Low yield: early (42.5% of records), mid (32.9% of records), late (24.6% of records)

Medium yield: early (34.6% of records), mid (33.7% of records), late (31.7% of records)

High yield: late (41.1% of records), mid (32.1% of records), early (26.8% of records)

Feature: soil\_texture

Low yield: clay (35.0% of records), loam (33.4% of records), sandy (31.6% of records)

Medium yield: clay (33.9% of records), loam (33.6% of records), sandy (32.5% of records)

High yield: sandy (35.3% of records), clay (32.5% of records), loam (32.2% of records)

Numeric feature ranges by yield band:

Feature: maturity\_days

Low yield: 110.00 – 149.00

Medium yield: 110.00 – 149.00

High yield: 110.00 – 149.00

Feature: base\_yield\_potential\_t\_ha

Low yield: 2.85 – 4.96

Medium yield: 2.87 – 5.24

High yield: 2.96 – 5.25

Feature: mean\_temp\_gs\_C

Low yield: 12.06 – 32.00

Medium yield: 12.04 – 31.97

High yield: 12.00 – 31.92

Feature: temp\_flowering\_C

Low yield: 10.03 – 35.00

Medium yield: 10.00 – 34.99

High yield: 10.02 – 34.95

Feature: seasonal\_rain\_mm

Low yield: 250.30 – 948.70

Medium yield: 251.10 – 949.90

High yield: 250.50 – 949.20

Feature: rain\_flowering\_mm

Low yield: 0.00 – 249.80

Medium yield: 0.00 – 250.00

High yield: 0.30 – 249.90

Feature: humidity\_mean\_pct

Low yield: 35.00 – 89.90

Medium yield: 35.00 – 89.90

High yield: 35.10 – 89.90

Feature: solar\_MJ\_m2\_day

Low yield: 12.06 – 24.98

Medium yield: 12.01 – 24.95

High yield: 12.01 – 24.96

Feature: soil\_pH

Low yield: 4.50 – 8.49

Medium yield: 4.50 – 8.50

High yield: 4.50 – 8.49

Feature: soil\_oc\_pct

Low yield: 0.20 – 1.80

Medium yield: 0.20 – 1.80

High yield: 0.20 – 1.80

Feature: clay\_pct

Low yield: 5.00 – 59.90

Medium yield: 5.00 – 59.90

High yield: 5.00 – 60.00

Feature: soil\_depth\_cm

Low yield: 40.00 – 149.90

Medium yield: 40.30 – 150.00

High yield: 40.10 – 150.00

Feature: soil\_N\_status\_kg\_ha

Low yield: 80.10 – 219.50

Medium yield: 80.50 – 219.50

High yield: 80.40 – 220.00

Feature: soil\_P\_status\_kg\_ha

Low yield: 5.00 – 39.90

Medium yield: 5.00 – 40.00

High yield: 5.00 – 40.00

Feature: soil\_K\_status\_kg\_ha

Low yield: 80.50 – 399.90

Medium yield: 80.00 – 399.90

High yield: 81.30 – 399.90

Feature: fert\_N\_kg\_ha

Low yield: 40.00 – 259.60

Medium yield: 40.00 – 259.50

High yield: 40.40 – 259.90

Feature: fert\_P\_kg\_ha

Low yield: 10.00 – 80.00

Medium yield: 10.10 – 79.90

High yield: 10.00 – 79.80

Feature: fert\_K\_kg\_ha

Low yield: 0.10 – 119.90

Medium yield: 0.20 – 119.90

High yield: 0.20 – 119.70

Feature: sowing\_doy

Low yield: 60.00 – 259.00

Medium yield: 60.00 – 259.00

High yield: 60.00 – 259.00

Feature: plant\_density\_plants\_m2

Low yield: 70.01 – 159.72

Medium yield: 70.08 – 159.97

High yield: 70.12 – 159.91

Feature: irrigation\_events

Low yield: 0.00 – 5.00

Medium yield: 0.00 – 5.00

High yield: 0.00 – 5.00

Feature: herbicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: insecticide\_apps  
Low yield: 0.00 – 3.00  
Medium yield: 0.00 – 3.00  
High yield: 0.00 – 3.00

Feature: fungicide\_apps  
Low yield: 0.00 – 2.00  
Medium yield: 0.00 – 2.00  
High yield: 0.00 – 2.00

Feature: weed\_pressure\_index  
Low yield: 0.00 – 0.82  
Medium yield: 0.01 – 0.83  
High yield: 0.01 – 0.81

Feature: pest\_pressure\_index  
Low yield: 0.01 – 0.88  
Medium yield: 0.04 – 0.96  
High yield: 0.01 – 0.88

Feature: disease\_pressure\_index  
Low yield: 0.04 – 0.93  
Medium yield: 0.01 – 0.89  
High yield: 0.03 – 0.92

Feature: ndvi\_early  
Low yield: 0.20 – 0.79  
Medium yield: 0.20 – 0.80  
High yield: 0.20 – 0.80

Feature: ndvi\_flowering  
Low yield: 0.30 – 0.90  
Medium yield: 0.30 – 0.90  
High yield: 0.30 – 0.90

Feature: ndvi\_peak  
Low yield: 0.40 – 0.90  
Medium yield: 0.40 – 0.90  
High yield: 0.42 – 0.90

Feature: ndvi\_late  
Low yield: 0.20 – 0.84  
Medium yield: 0.20 – 0.84  
High yield: 0.23 – 0.84

Feature: ndvi\_veg\_slope  
Low yield: 0.00 – 0.03  
Medium yield: 0.00 – 0.03  
High yield: 0.00 – 0.03

Feature: seed\_moisture\_pct  
Low yield: 7.00 – 20.00  
Medium yield: 7.00 – 20.00  
High yield: 7.00 – 19.90